RAILROAD GAZETTE

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Contributions.

Defective Discipline.

To the Editor of the Railroad Gazette:

The present managers of the New England railroads have made so many improvements in their operation that it is a surprise to find a detail of some importance which they have overlooked. West and south of New York, passenger trainmen are required to alight at way stations and assist passengers, and especially ladies, on and off the trains.

This is a point which seems to have been neglected by more than one of the New England railroads, and to a passenger who is accustomed to the other system it is very disagreeable to find the trainmen at way stations standing on the car platform, where their presence is rather a hindrance to passengers to and from the cars than an assistance.

It seems an ungracious thing to comment on a matter of this kind in a particular way, and possibly if you will give the matter the publicity of your columns the gentlemen in charge of the roads concerned may see their way clear to looking after these details.

G. H. T.

Passenger Classification.

Troy, Oct. 26, 1898.

To the Editor of the Railroad Gazette:

It goes without saying that classification of passenger business has been many times considered by managers in this country, and the conclusion has been doubtless reached that any such classification as exists abroad is unwise for us. We have an approach to such classification in the tourist cars and rates of the transcontinental lines, and there is a very close approximation to it in the second class cars and rates of the Southern Pacific line between San Francisco and Sacramento, and there may be other approximations elsewhere.

But is it certain that it would be unwise to more widely adopt this system, at least in the more thickly settled portions of the country?

The revenue in this country per passenger train mile exceeds the average cost of all trains per train mile by so small an amount as to warrant the conclusion by one not familiar with the relative cost of a passenger train mile and a freight train mile, that the resulting net revenue from passenger business is extremely small, if, indeed, it averages anything at all.

About seven times as many ton miles as passenger miles are handled with but one-third more freight train miles than passenger train miles. The average number of passengers per train is about one-fifth the number of tons per train, and the same ratio exists between the average travel per passenger and the average haul per ton. The average passenger rate is about two and one-half times the ton rate.

Comparison of these figures with some others contained in the last Indian Railroad report leads one to ask again if all is being done that can be done to increase passenger revenue. The conditions existing in India are, we all know, very different from those in this country, but the comparison is nevertheless interesting.

In India it both costs less, and pays less (gross) to carry a passenger one mile than to carry a ton of freight one mile. Just what are all the reasons for this does not appear to be plain.

The people are poor and are not supposed to be natural travelers, and they must be carried cheap or not at all. They are carried for less than one-third the average rate of this country, and there are more passengers per train than there are tons of freight per train in this country. About 97 per cent. of these passengers are third class. There are rather more passenger miles than ton miles, but the discrepancy is not great. The revenue per passenger mile is a handsome profit on its cost.

It would seem that with all the differences in condition between India and the United States, the comparison of the figures given ought to make us stop and consider.

It is well known that travel increases with reduced rates, and in much faster ratio than the reduction of rates. While rates must not be reduced below cost, it would seem to be possible to introduce a second and third class fare, by either running some slow trains of comparatively inexpensive cars, or by putting such cars on regular trains, as might best serve the requirements of individual lines, and thereby bring out a great deal of travel that is now merely potential.

That a considerable amount of travel paying present rates would be diverted to the lower classes goes without saying, and the whole question becomes this: Will the travel secured at the lower rate exceed the loss from the higher rate now prevailing?

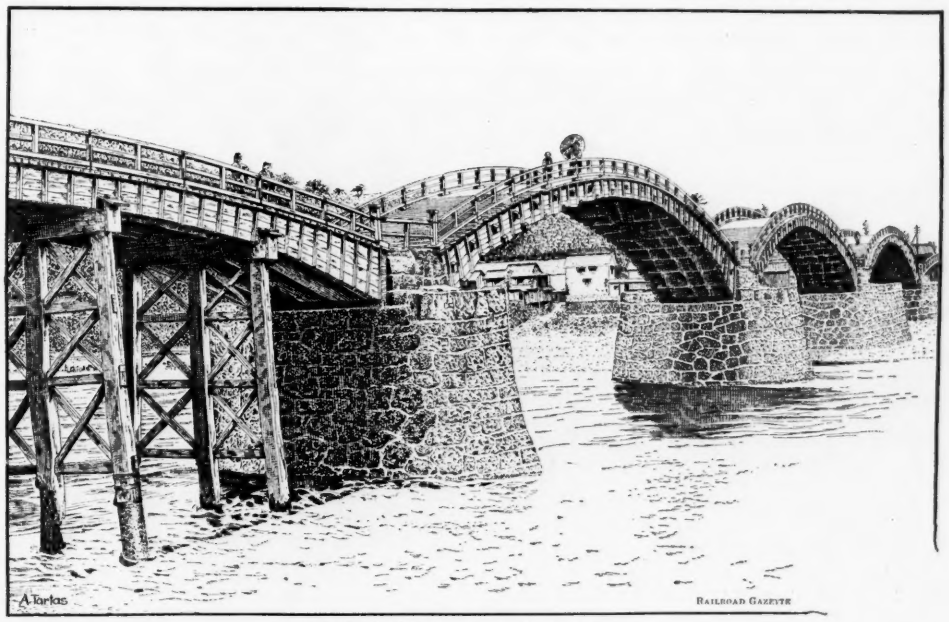
The comparison of figures given seems to indicate that there would be a net gain if the classification is properly arranged. Is it not worth a trial on some of the roads in the more densely populated sections of the country?

WILLIAM G. RAYMOND.

A Japanese Bridge.

From a photograph presented to Mr. Theodore Cooper by Mr. William R. Webster, we have been allowed to make a drawing of the remarkable bridge at Iwakuni, Japan. Iwakuni is a provincial town of Swo, situated along the river Nishikigawa, over which the famous Kintai-bashi is built. As the river forms rapids in many places, the common bridge over it at an early date was often broken down after heavy rains, and it was necessary to build a more permanent structure, and this quaint, strong and handsome bridge is the result.

It was designed by the Daimio some 230 years ago, and was the first bridge completed under his personal superintendence. Since that time it has stood the test of many storms and floods, and citizens and travelers who have to pass over it are thankful for the solidity of construction. The bridge is 900 ft. long and its highest part 80 ft. above the water. It consists of five spans of 150 ft. clear, and the two spans at the ends are of the usual arch girders, supported by many posts. Three spans between them are of five wooden girders, composed of many thousand small pieces of wood connected with iron, thus forming immense semi-circular arch girders, which rest on large stone piers 33 ft. by 18 ft. They are sunk to the depth of 50 ft., and all the stones composing them were cemented together with lead. The piers are 20 ft. higher than the river bed, and are paved 250 ft. wide on both sides of the bridge. We are told that "it was owing to his great scientific knowledge that the Daimio was enabled to successfully build a permanent bridge."



A Wooden Bridge at Iwakuni, Japan.

The Adoption of a Standard Knuckle.*

I will give facts and figures, gathered by close observation during the past seven years in heavy interchange of cars, to show why a standard knuckle should be adopted by the M. C. B. Association.

We have standards for many parts of trucks, and standard drawbars, but the latter ends at the contour lines, leaving the most essential feature, the knuckle, not standard. The knuckle receives the shock first and is, therefore, most likely to be injured, and for this reason, if for no other, it should be interchangeable. Delays of several hours are frequently caused by having to set a car on the repair track to change the bar, because there may be no knuckle at hand which will fit the coupler head. With the link and pin bar such delays would not occur.

During the last few months I have endeavored to secure the names of the different knuckles in use at the present time and the numbers of different designs furnished by each coupler company. The result was much of a surprise to me; the number is still on the increase, as can readily be seen by referring to the list of patents issued each month. The following statement represents the result of my efforts in the direction referred to:

KINDS OF M. C. B. COUPLERS AND KNUCKLES IN USE.

Weight of Knuckle. Lbs.	Name of Coupler.	Number of Knuckles.
46	American	2
	Ajax	1
49	Barfield	1
	Barnes	1
	Brown	1
54	Burns	1
46	Buckeye	3
	Cowell	1
48	Columbia	1
51	Chicago	2
35	California	1
40	Champion	1
	Deetz	1
64	Dowling	2
57	"	
60	Drexel	2
45	Detroit	1
43	Diamond	1
52	Excelsior	1
	Edwards	1
36	Empire	1
42	Eureka	1
51	Erie	1
41	Elliott	1
	Foster	1
49	Forsyth	1
	Fox	1
38	Gould	1
38	Gallager	1
	Gifford	1
	Gelston	1
51	Hinson	2
41	"	
38	Hien	2
	Imperial	1
40	Interstate	1
37	Janney	1
37	Johnson	1
	Kling	1
	Laburt	1
61	Ludlow	1
50	Lone Star	1
50	Little Delaware	1
49	Mo. Pacific	2
37	Mather	1
48	Murphy	1
	Marks	1
53	New York	1
43	National	1
	Price	1
38	Pooley	1
49	Perfected	1
	Paragon	1
39	Peerless	1
	Pacific	1
	Rickison	1
55	Standard	1
49½	Solid	1
	Shomaker	1
	Saams	1
	Springer	1
	Simplex	1
54	St. Louis	2
47	Smith	1
66	Standard, Improved	1
53	Smillie	2
51	S. H. & H.	1
51	Safety	1
50	Talbot	1
50	Trojan	1
53	Tower	2
50	Thurmond	2
46	Taylor	1
	Timms	1
	Union	1
50	Vandorson	1
34	Williams	3
40	"	
45	"	
	Walker	1
50	Washburn	1

A total of 77 bars and 93 knuckles; nine bars having two, and two bars having three knuckles each, and in only one instance will the knuckles interchange with each other. The average weight of the 56 knuckles, the weight of which is known, is 48 lbs., the heaviest being the Standard, 66 lbs.; the lightest the Williams, 34 lbs.

In order to have, in way cars or at interchange points, knuckles (one of each kind) averaging 48 lbs. it would require 4,464 lbs., which, at 3½c. per lb., would cost $156.24. To furnish one knuckle of each of the above kinds, at 16 different points and for 20 way cars, it would require 160,704 lbs., representing a value of $5,624.64.

I find, from the records kept in my office for the past six and one-half years, that as the number of M. C. B. bars handled increased, the percentage of broken bars and of broken knuckles decreased, as shown by the following table:

Year.	Per Cent. M. C. B. Bars.	No. Cars to 1 Bar Broken.	No. Cars to Knuckles Broken.
1892	8 per cent.	377	2,476
1893	15 per cent.	385	1,084
1894	20 per cent.	424	1,609
1895	28 per cent.	620	1,663
1896	42 per cent.	996	2,345
1897	48 per cent.	1,240	2,573
1898	59 per cent.	1,872	3,047

A large proportion of the breakage of knuckles occurs when an M. C. B. coupler is coupled with a link and pin bar, such breakages being most likely to

*Extracts from a paper by Mr. Peter H. Peck, Master Mechanic of the Chicago & Western Indiana, presented at the October meeting of the Western Railway Club.

occur in heavy trains. In some cases the coupling is made by the pin being placed through only the top hole of the knuckle and into the link; this either breaks the top lug off or breaks out the pin hole; in other cases the knuckles may be broken when two cars strike together and both knuckles are closed. Very few M. C. B. bars are broken when two of these bars are coupled together. Included in our own equipment we have 88 cars and 22 locomotives equipped with M. C. B. couplers; 32 cars equipped last year and the locomotives equipped within the last eight months. As yet we have had but one knuckle broken (that on a car) and that was caused by an accident. One of the engines equipped in this manner is double-crewed most of the time for service both night and day. This serves to illustrate the fact that the proportion of breakage to M. C. B. couplers on switching roads is much less than many believe to be the case.

I do not find, in actual practice, the trouble anticipated by Mr. P. Leeds, in his paper before the Central Association of Railroad Officers, as published in the Railroad Gazette Aug. 12, 1898, viz.: Flange wear or crowding the flanges against the rail, or that the bar is not strong enough for our modern 80,000 and 90,000 lbs. capacity. We handle hundreds of these cars and the number of breakages of couplers is no greater than with other cars. We do find, however, that when these heavy cars strike very hard the load shifts, in some instances forcing the end out of the car, but not breaking the bar. I have seen cases of rear end collisions and trains breaking in two, and have found that in such accidents the damage to M. C. B. bars was not one-fourth as great as that to link and pin bars. Cars are not as liable to telescope when equipped with M. C. B. couplers as when equipped with link and pin drawbars.

In regard to the handling of passenger equipment, we have five roads for which we do the switching at Dearborn station, four of which use the M. C. B. bars, the fifth the Miller hook bar. It is possible to couple the M. C. B. couplers on short curves where the same is impossible with the Miller hooks. We have two engines equipped with the M. C. B. couplers in this service and we are able to couple the engine to M. C. B. bars at points where it is impossible to couple the Miller, with link and pin.

Finally, the trucks, draft rigging, drawbar stops, uncoupling levers and knuckle should be standard and interchangeable. The knuckle, most important of all, should receive immediate attention by the M. C. B. Association, and either the patent rights of a knuckle should be purchased by the Association, or six or seven of the best knuckles at present on the market should be adopted as standard; there are, at least, six or seven which are first-class. If something like this is not done before the law goes into effect we will soon be in a worse sea of trouble in interchanging cars than we were in with the link and pin. A cored or hollow knuckle should not be considered; such knuckles are of no value whatever. It is only fourteen months to the time the law takes effect, and something along the lines indicated in the foregoing should be done without delay.

Discussion.

Mr. Gustav Giroux (C., B. & Q.): I think railroad companies ought to be more particular than they have been, when buying couplers, and insist that the couplers be put together in a workmanlike manner and that all parts be made uniform; then the railroads should see that, when cars are inspected, the same attention is given to the coupler as to the body of the car, to the truck or to the air brake. A point that ought to receive some attention soon, is the amount of play that can be allowed around the contour line before the coupler becomes unsafe. There is an M. C. B. gage that gives a minimum and maximum limit to this play, and the requirements are demanded by a few roads when buying new couplers; but is there no limit to this play after the coupler is put in service?

It will pay to get couplers fitted together in a better manner and with as little lost motion as possible, because we all know a coupler wears loose too soon. Require that the contact parts of the coupler be smooth and clean, free from sand, grit or scale, and the coupler will work easier. I think that it would be much better for all roads to request the manufacturers not to paint couplers, but to put the cost of painting into producing smoother and cleaner castings and fitting the same together with more care; this would enable us to see who are turning out the best castings. I hope that a standard diameter and length of pivot pin will be adopted; we now have pins 1¼, 1⅝, 1½ inches in diameter, and find couplers made for 1½-in. pivot pin repaired with pins 1⅝ or 1¼-in. in diameter. Again, if a cotter or split key is put through the lower end of the pivot pin, I think we would not hear of so many pivot pins working out of place. I also hope that the M. C. B. Association will get out very soon a standard specification, specifying not only what kind of a test couplers shall stand, but also specifying the length of guard arm, amount of play around contour line (not only for new couplers but also for couplers in service), diameter and length of pivot pin and diameter of hole, thickness of knuckle through pivot pin hole, and distance between lugs of bar, and that all parts shall be plainly marked at a specified place in such a manner as to enable ordering parts for repair.

Mr. A. M. Waitt (L. S. & M. S.).—I think no one will question the desirability of having a standard knuckle for couplers, but many will question the probability that we shall ever enjoy such good fortune. It would not be practicable to attempt voting into existence anything in the way of a standard coupler or a standard knuckle. We have a bad condition of things, and the only way to get out of it is by the same way that must be practiced in moral affairs. The improvement must be accomplished by slowly educating public opinion to the higher plane. It seems to me that to approach uniformity in the M. C. B. couplers, or in the knuckles, can be accomplished only gradually and by educating people to appreciate what is the best. I believe we can, however, go a great way toward eliminating the poorer class of couplers and knuckles, either by bringing about the survival of the fittest or in some other way reduce to a few the number of couplers in the market. That can only be done, I believe, by adopting a specification of some kind. Before the subject of M. C. B. couplers is dropped this Club, if no other organization, should take the initiative and compile practical specifications for couplers that will assure us, if they are fulfilled, of getting the best out of the 40 or 50 couplers which Mr. Peck has enumerated in his paper.

Mr. F. A. Delano (C., B. & Q.): I would suggest the appointment of a committee by us to look into the whole question, not confine it to the question of the "knuckle," but also to the other parts of the coupler, and to some of the points brought out by Mr. Giroux; for example, that these M. C. B. couplers are being put on cars without complying, in the first place, with the M. C. B. regulations.

Mr. George S. Payson (Western Railway Association): I have had at my office, a number of times, meetings of various representatives of coupler companies; they considered the adoption of a standard coupler, but each time the deliberations came to naught because somebody would undersell the price by $2 a bar, and the deliberations would end immediately. If six or seven of the best couplers are chosen, somebody will offer couplers at, say, $2 a piece cheaper than the agreed price. It has been claimed that these cheaper couplers are not fit to use, but some roads continue to use them.

I do not see how you can adopt any knuckle that would work in all the different couplers. Mr. Peck suggests the purchase of patent rights. I know a little about the patents, and there is not a patent on any knuckle that would interchange with all couplers. So far as my best information goes, there are only four knuckles that are covered by patents; these will not interchange with other knuckles. I question whether these patents are good anyway. I should think if you adopt a standard knuckle, which I do not think is possible without a standard coupler, you would have to take a coupler the patent on which had expired, or get a new knuckle and patent that for the M. C. B. Association. We have no knuckle the patent on which I think is worth purchasing. I think the price will defeat the adoption of a standard knuckle or coupler, unless you can secure an agreement on the part of the roads that they will not buy at less than a certain price. I have considered this thing a great many times within the last five years, and the price has always knocked out anything I could do.

Mr. Delano: I move that in the first place the minutes of our meeting, with the paper by Mr. Peck and the discussion on it, be sent to the railroad clubs of the country, with a request to the officers of those clubs that the whole subject be taken up and discussed by them; and that a committee of five from our membership be appointed by the Chair to consider the subject in its broad aspect, not confining themselves to the question of the knuckle, but considering the whole subject, and be prepared to report at some future meeting of the Club what action they would recommend. I do not want to tie the members of that committee in any way. They may find, after looking into the subject, that absolutely nothing can be accomplished. Adopted.

President Schroyer: I will appoint on that committee Mr. Delano as chairman, Mr. Peck, Mr. Barr, Mr. Mackenzie and Mr. Fildes.

The Disposition of the Air Pump Exhaust.

Mr. F. M. Whyte, at the October meeting of the Western Railway Club, opened the discussion of the topic, "What is the best disposition to be made of the exhaust from the air pump?" He stated that the objection to the usual practice, of conducting the exhaust to the front end and up the stack, is that when the pump is working the strongest and having the greatest effect on the fire is just the time when the fire should be agitated the least. For this reason some have tried piping the exhaust to the ashpan, or beneath the cylinder saddle, or to various points in the front end. These methods have not been wholly successful.

Mr. J. H. Setchel, of the Pittsburgh Locomotive Works, stated that in his opinion the exhaust steam should be conducted into the tank, so as to heat the feed water. He also stated that a simple device which does this satisfactorily is now being used by the Wabash Railroad, and was designed by Mr. J. B. Barnes, of that road; the engineman, by moving a bell crank, can either direct the exhaust into the tank or up the stack. Before passing into the tank the steam goes through a trap which catches the oil. This arrangement was illustrated in the Railroad Gazette, March 19, 1897, page 205.

Mr. E. M. Herr gave the following description of a feed water heater used by him on the Northern Pacific:

"The last eighteen engines that we built for the Northern Pacific under my jurisdiction had pipes leading from the exhaust side of the air pump through the tank, and in order to get rid of any possibility of oil giving trouble in the tank, the pipe did not deliver the steam into the tank; the water of condensation dropped upon the roadbed after passing through the coil of pipe in the tank. The arrangement of this pipe was as follows: It was brought up on the right-hand side, right next to the tank valve and vertically to the top of the inside of the tank. From this point it extended toward the back and downward in a gradual slope, and zigzag across the tank the width of one water leg until it finally passed through the tank near the back. As the water in the tank got lower, the heating surface exposed to it was continually reduced, and the amount of heat going into the water was correspondingly less; consequently there was less liability that the water be heated to too high temperature. When the tank was full, of course the water came in contact with more heating surface and more heat was absorbed by it. If the engineer ever did get caught with water so hot he could not work the injector, it always occurred with the right-hand injector first, because the pipe went into the right side, entering near the feed valve opening. In such a case he could always readily start the left-hand injector, because in the left leg of the tank there is no heating pipe, and there is a considerable reservoir of cold water which could be used in an emergency, and would supply cold water enough to be used by the left injector until the next water station was reached. I was surprised to find that there was very little difficulty of this kind on these passenger engines; there were sixteen of them hauling through passenger trains, doing pretty heavy service, and the engineers ran their exhaust in the tank continuously, very seldom having to divert it on account of the water getting too hot; that happening only in very hot weather. In the fall and spring, and, of course, throughout the winter, there would be no occasion for them to change the exhaust from the tank. This is a very important factor in saving of fuel, as can be very clearly seen when one considers that, as I believe the authorities estimate for every 11° rise in the temperature of feed water there is a saving of about 1 per cent. of coal used in the generating of steam. This is a theoretical consideration, but I thought we could notice in the fuel consumption and in the steaming of the engine in bad weather a very undoubted and practical advantage. In practice the temperature was rarely raised above 90°, and 90° is about the limit at which an ordinary injector will handle water. I did a great deal of experimenting with different makes of injectors to find out which would handle the hottest water. If, as seems to be the case, one can effect a saving of 1 per cent. of coal for each 11° increase in temperature of feed-water by reason of using the exhaust steam, we certainly should get that injector which will handle feed-water at the highest temperature possible, and obtain this economy. By experimenting, I found one injector that would handle feed-water at a temperature of 124°."

Mr. E. W. Pratt, of the Chicago & Northwestern, stated as another purpose for which the exhaust from the air pumps could be used was in heating trains in cold weather. The Chicago & Northwestern during two winters has so heated a two-car suburban train running in the Lake Superior region. It was also stated that the Union Pacific has tried a similar disposition of the exhaust. On the latter road, aside from the exhaust from the air pump, a pressure reducing valve was used that automatically opened when the exhaust failed to give a certain required pressure, and the deficiency was made up from the boiler direct. For instance, it was deemed advisable to have 20 lbs. pressure at the engine to heat a certain length of train; if the air pump failed to supply 20 lbs. pressure the reducing valve opened and the deficiency was supplied from the boiler direct. If the back pressure on the pump became greater than 30 lbs. an overflow valve opened and allowed the steam to escape to the front end.

Wrought Iron at Low and High Temperatures.

In 1897 tests were made at Cornell University on metals at high and low temperatures, the results of which are given below, and for which we are indebted to an article by Prof. R. C. Carpenter in the 1898 issue of the Technic, the yearly publication of the University of Michigan Engineering Society.

The results of the investigations indicate that the temperature has an important effect on the strength of the material, and that in regard to most materials, i. e., either wrought iron or steel, the strength is practically a minimum at about 70° F. and increases as the temperature is changed in either direction, becoming about 20 per cent. stronger at temperatures of about 500° F. on the one hand and 60° below zero on the other. The law of increase of strength for wrought iron is shown graphically in Fig. 4, accompanying this article. By consulting this it will be noted that the increase in strength is gradual but well marked as the temperature changes in either direction.

Besides the strength of metals an important consid-

eration is that relating to their toughness or power to resist shock; this property is indicated in tension tests by the amount of elongation found within the elastic limit and up to the point of rupture. A study of this property indicates that the lowering of the temperature from 70° to that of 60° below has little or no sensible effect on the ductility of the metal, but that a considerable change is experienced by increasing the temperature. Our investigations of the strength of metals at high temperatures indicate a brittle region at the temperature of steam at 5 to 10 lbs. pressure, and this same property has also been noted by a German investigator, from which it would seem that although the strength is increased the metal has less power to resist the effects of shocks at the ordinary temperature of steam than when at the usual temperature of the air.

During the past year a number of tests were made in the laboratories of Sibley College by Prof. Carpenter with the assistance of R. E. Chandler, M. E., and L. L. Brinsmade, B. S., both graduate students, on the tensive strength of wrought iron at low temperatures.

The specimens selected were from uniform stock. The test was made on an Emery testing machine of the horizontal type, built by William Sellers & Co. The test pieces, after being placed in position, were surrounded by a freezing mixture which was placed in a box fitted around the specimens, the box being several inches longer than the reduced portion of the specimen. Several clamps were attached to the speci-

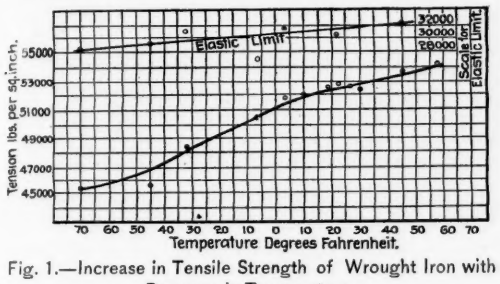


Fig. 1.—Increase in Tensile Strength of Wrought Iron with Decrease in Temperature.

men well within the box containing the freezing mixture, and of such a form that the ends extended outside the specimen and gave an opportunity for measuring the extension with micrometer screws, which were arranged parallel and equidistant from the center of the specimen.

Considerable difficulty was found in obtaining a suitable freezing mixture. The first attempt was made to secure low temperature by means of the expansion of compressed air in some fluid that would not freeze, as for instance brine for the higher temperature and alcohol for the lower, but because of the lack of a suitable motor for transforming the heat of the air into work but little reduction of temperature was secured by this method, and other means had to be employed.

It was found after considerable experiment that by surrounding the specimen with alcohol and by spraying liquid carbonic acid into this that it was possible to hold and maintain a temperature at any desired point as low as 70° F. below zero at pleasure. Tests were made showing the strength of the specimen within a range of temperature of 70° above to about 70° below on the F. scale.

The increase in strength due to diminution of temperature was frequently sufficient to cause the specimen to break in the larger cross-section near the ends of the specimen, which was necessarily exposed at the temperature of the room. To overcome this tendency to break in the larger cross-section it was found necessary to reduce the area of cross-section near the center specimen more than originally intended.

The general results show, first, a decided increase in strength, accompanied by a corresponding rise in the strength at elastic limit as the temperature is lowered, which is not, however, quite so well marked. The percentage of elongation remains essentially constant and so does the modulus of elasticity at all temperatures from 70° F. to 60° below zero, or within the range of the test. The accompanying diagrams give the results of the test and show the variation in strength due to change of temperature.

Some previous tests were made on wrought iron

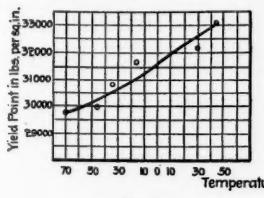


Fig. 2.

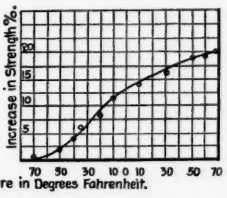


Fig. 3.

and steel at high temperatures, which show a decided increase in strength as the temperature increases from 70° to about 500° F., after which the strength rapidly decreases. A combination of these experiments would serve to show that the strength of wrought iron increases with the change in temperature from about 70° F. in either direction and that the increase is well marked, and of considerable amount, and is characteristic of all specimens.

The tests of wrought iron at low temperatures seem to indicate that iron is not only stronger than at ordinary temperatures, but that it is equally ductile and hence under no circumstance more likely to be broken by suddenly applied shocks or blows. From the fact that iron railroad rails break more frequently at low temperatures than at high, it was formerly believed that iron at low temperatures was more brittle; this phenomena is probably to be explained, however, not by the increase of brittleness on the part of the iron, but by the increase in the severity of the shock caused by the rolling stock and wheels of the train impinging on the metal when in contact with the frozen ground. The latter condition is doubtless a favorable one to produce crystallization, and it is quite reasonable to suppose that the increased number of breaks in extremely cold weather is due, not to increased brittleness of the metal, but to crystallization produced by a great number of severe blows.

The lower curve in Fig. 1 shows the increase in tensile strength, with decrease in temperature. On the same diagram is drawn a curve which shows the strength at the elastic limit with decrease in temperature. This latter curve is not perfectly regular, but neglecting a single observation the results of all the tests show a sensible rise in the elastic limit with

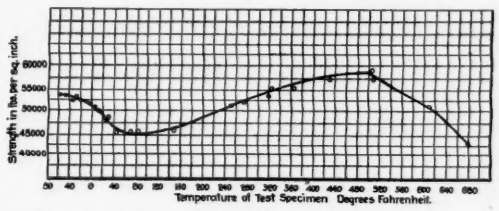


Fig. 4.—Tension Tests on Wrought Iron at Different Temperatures.

decrease of temperature. The position of the elastic limit, as shown in this diagram, was obtained by carefully plotting all the observations and taking the position of the elastic limit as the point at which the deformations ceased to be proportional to the stresses.

The diagram, Fig. 2, is interesting, since it shows the relation of yield-point or what is frequently termed the commercial elastic limit to the load. In this case the yield point is defined as the point at which the first permanent set becomes visible, due to settling of the scale beam. By comparing the two curves it will be noted that this latter quantity is somewhat above the true elastic limit, but the same law of increase of strength with reference to decrease of temperature applies.

Fig. 3 shows the curve of increase in strength plotted, with reference to the strength at 70° F. as 100.

Fig. 4 is a combined diagram showing the results of the tests made both at low and at high temperatures. In plotting this diagram, in order to make it continuous, the strengths of both series of tests were equalized at 70°. This is an arbitrary assumption which may not be quite true, but its effect on the result would only be to raise the curve of strength for the higher temperatures slightly above the posision shown. The test for the materials at high temperatures was made some years previously to that of the test with low materials, and the nature of the stock used in the different tests seems to have been somewhat different, since the material tested at high temperatures was a few per cent. stronger.

The stock used in both series of tests was as nearly

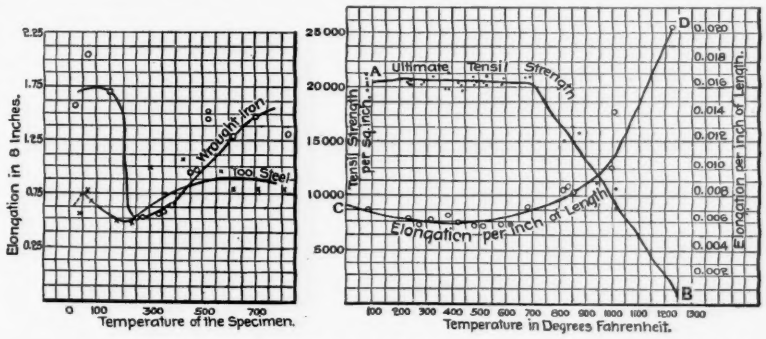

Elongation in 8 inches.
Temperature of the Specimen.
Ultimate Tensile Strength
Tensile Strength per sq. inch.
Elongation per inch of Length.
Temperature in Degrees Fahrenheit.

Fig. 6. Fig. 7.—Effect of Temperature on Strength of Cast Iron.

uniform as possible, and the uniformity of the results shows very clearly the effect of cold and heat on the strength of the material. It cannot be claimed that the investigation is complete, since it would be extremely interesting to test other materials under the same condition, and also to determine the effect of varying the composition.

Following the curves of this series of tests, are given in Fig. 5 the results of tests of wrought iron, machinery steel and tool steel at high temperatures. The similarity of the curves, for different materials, shows, so far as the point of maximum and minimum is concerned, that the nature of the material has little effect on the general character of the relation of strength to change of temperature, and farther, that the strength of material is affected to a great extent by the temperature.

In Fig. 6 is given the elongation in specimens, 8 in. in length of wrought iron and tool steel at different tempratures, from which it is noted that a minimum elongation is found at a temperature of about 250°, after which the elongation increases with the temperature.

Effect of Temperature on the Strength of Cast Iron.

A number of experiments have also been made to determine the effect of increasing the temperature on the strength of cast iron. The results of these various tests are shown in Fig. 7.

By study of the curves corresponding to these various tests it will be noted that the tensile strength of cast iron remains uniform from a temperature of 70° to that of nearly 700°, but from that point it decreases in proportion to the increase of temperature, until it becomes practically nothing at a temperature of 1,240°.

The elongation per inch in length seems to slightly decrease from a temperature of 100° to 400°, after which it increases with increase of temperature until the temperature of 1,200° is reached. The elongation of cast iron is exceedingly small under best conditions, and hence this latter property is one of little importance, except as indicating a brittle region in the neighborhood of 300° or 400°.

Crystallization.—The subject of the cause of the crystallization of iron has been investigated so far as lay within our power by numerous experiments in the Sibley College laboratories, the attempt being made to produce crystallization by some method of applying stress. The method of making these tests will be briefly stated to have consisted in the rupture of similar materials, first by falling weights moving with greater or less rapidity, then by shocks caused by the explosion of gunpowder and dynamite, then by breaking with blows after a repeated number of heatings and coolings, and finally the application of a great number of blows of small intensity.

The general results of these investigations indicated that the statement which is made in nearly every text book relating to the strength of materials, and even in some of the recent books on this subject, that crystallization could be produced by a rapidly applied blow, was entirely erroneous; on the contrary, the elongation was found to increase with the velocity of the blow; thus with the application of a static load a certain elongation was produced, by rupturing with a blow the elongation was increased, by rupturing with gunpowder the elongation was still greater, and with dynamite it was even greater yet. The effect of applying rapid blows or of rupturing with great rapidity had in no case the tendency to produce crystalline fracture. The effect of breaking after a large number of repeated heatings and coolings has been stated by some authorities to produce a crystalline fracture; but the results of a large number of experiments did not, however, in any case show that such was the fact, and the conclusion which the writer drew from these experiments was that crystallization was not caused by conditions due to changing temperature. It is admitted that the only evidence respecting this point is of a negative character, but it is believed that the experiments covered more alterations of heat and cold than would be found in any practical case. The experiments in the line of a great number of blows of light intensity were more promising, and several cases of distinctly crystalline fracture were produced.

These experiments, together with the fact that breaks showing crystalline fracture are almost invariably found where material is used in such a manner as to be subjected to repeated shocks of small intensity, have led the writer to believe crystalline fracture may be and is produced in material which is originally fibrous and of excellent quality, by a repeated number of blows or shocks, any of which are of small intensity, but are repeated with great frequency, the effect of these blows or shocks being to cause a new arrangement of the molecules which constitute the fibers into a crystalline form, and hence into such a position as to possess little tenacity or coherence. This view is strengthened from the fact that nearly all the breaks which occur in lines or coupling pins used by railroads are distinctly crystalline, and the rupture occurs without any reduction in the section of the metal or any elongation of the original material. In the service which causes these breaks there is an application of a repeated number of shocks of small intensity.

Some writers have contended that crystalline fracture was only found in material which was originally of bad quality, and that the crystalline structure always existed in the material; this view the writer is certain is incorrect, as he had experience with a machine in which repeated crystalline breaks occurred, and these could not be prevented by the use of the very best quality of material, and material which was known to have been free from defects of any character.

In connection with crystalline breaks it will usually be found that the area affected by the crystaline action is at one section only of the material, and that

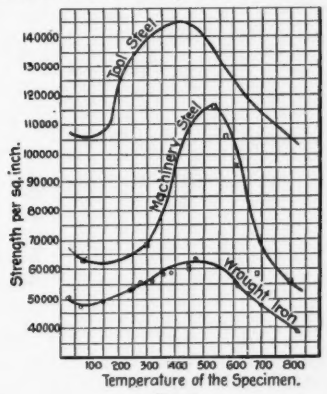


Fig. 5.

all other portions of the material are perfectly fibrous and of essentially excellent quality. This naturally can be accounted for by the theory that the change in molecular arrangement is caused by vibration of the particles which would be maximum at a certain position or cross section of the material and would affect it in no other place.

An Incident in the Claim Department.

The following account of two men who had a headquarters in a large city and pretended to have an office business, but who appear to have got their living by "working" the railroads and insurance companies, is told by a railroad claim agent. We have disguised the names.

A man named Moddy, in company with one Doddy, boarded a suburban train at the depot of a road en-

tering Chicago. Mr. Moddy claims that when passing through the aisle of the coach, he caught his foot on a screw protruding from the floor, and as a result fell, striking and injuring his left side on the arm of a seat, this in the presence of said Doddy; no one else witnessed the accident. At the place claimed, in the center of the car, a loose screw was found in the plate of the three-way valve. Moddy had evidently sustained an injury, judging from what his physician and our surgeon say of the case, a contusion and a fractured rib, and I took his option for $99, which was the lowest terms obtainable.

I find that in their operations, this is at least the fourth accident of this kind which they have had in this vicinity. In November last, Doddy, then giving his name with different initials, sustained injuries (so he claimed) in the same way, on one of the —— road's trains, from which company he got $200 in settlement. In April last Moddy had an accident on one of the —— railway company's trains in the same manner, and from that company secured $150 in settlement. Again, in May of this year, Doddy sustained injuries to his foot in the same manner as usual, stumbling over a screw in a coach in one of the —— railway company's trains, and from that road he received $100 in settlement.

Now our time seems to have come. I have examined the files of the other companies spoken of, and find that the signatures compare, and they are unquestionably the same persons. They boarded our train about twenty minutes before leaving time, and it was when there was no one in the rear car (the car they entered) except Brakeman R——. It is claimed that they boarded the train separately, Moddy coming last, after purchasing tickets, and entering coach No. ——, from forward platform. Brakeman R—— says they came in together, and entered car at rear end, and that he stepped aside in the aisle, while adjusting ventilators, letting them pass, and they took seats at forward end of car beyond the place where injuries were said to have been received. Some few minutes later, after Brakeman R—— had gone forward to combination car, he happened to look back, when he saw Brakeman W—— conversing with the parties, who were then seated near center of car. W——, it appears, was told by some passenger in the combination car that an accident had happened, and went to these men. In his presence Doddy lifted the loose screw from the 3-way valve plate and put it in his pocket. When Conductor C—— came, which was shortly afterward, W—— told him of the occurrence. He interviewed parties, and from them got the screw. Judging from the statements, the appearance of the screw, the fact that the case parallels the others, and was witnessed by no one save themselves, and the fact that Conductor C—— could find no mark on Moddy's shoe, which he claimed to have struck the screw with, the case looks suspicious. Coach No. — was given a thorough inspection by Inspector V—— that morning and all the screws in the 3-way valve plate were found in proper place. After the accident, and before Inspector V—— learned of it, his inspection being very close, he found the screw missing, and applied another in its place. The new screw took hold perfectly, nothing being worn.

In getting at the character of these men, I conferred with the claim departments of twelve Chicago roads, but could find no record of them except as above stated. At No. 000 —— street, a Mrs. S——, with whom they boarded last spring, told me that they were at her place six weeks, and that while there Doddy was laid up with an injured foot, about three weeks, result of some railroad accident, she said. They pretended to be traveling men; paid their board, and that is all she could say about them. At No. 18000 Batanza avenue, I was told that Mrs. H——, owner of property, was in New York, but lady there said that Moddy and Doddy stopped at that place about two weeks last fall, and one of them was laid up with an injury which she understood was received on some railroad. This was all she could say about them. I can simply say from my dealings with them, that they are two very "smooth articles." In discussing the matter, our surgeon says "crepitation" would be apparent in a bone once broken whose parts were not united, and that it would be an easy matter to produce the contusion. Dr. Z——, while he found no fracture, found abnormal temperature, which, of course, was indicative of injury.

Freight Traffic on Russian Railroads.

The total length of railroads constructed in Russia during 1897 amounts to 1,018 miles. The Government owns 16,773 miles, private companies 8,500 miles, and Finland 1,565 miles. On Jan. 1, 1898, there were 26,838 miles of railroad in the Russian Empire.

The aggregate amount of the principal freight for 1896 and 1897, showing relative increase or decrease, is as follows:

	1897. Tons.	1896. Tons.
Cereals arrived at frontier stations...	5,257,512	6,300,198
Sent from principal railroad stations:		
Pit coal	7,529,400	6,555,456
Kerosene, naphtha, and products thereof	3,413,808	3,084,120
Salt	925,020	871,056

The quantity of products transported from the principal stations of export has increased for all kinds of freight, especially pit coal, naphtha and petroleum. The movement of grain has decreased by 1,044,504 tons, or 6.6 per cent.

The following table shows the regions of arrival of cereals transported by rail, and their amount in tons:

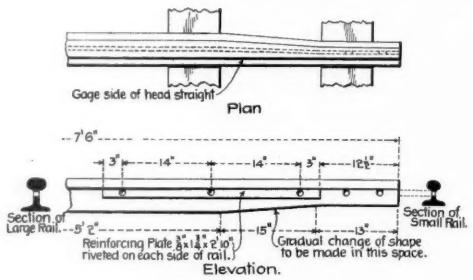
	1897. Tons.	1896. Tons.
Black and Azof Sea ports	2,179,008	3,167,416
Baltic ports	2,004,858	2,135,178
Western overland points	1,061,568	1,000,080
Baku and Petrovsk	12,078	7,524
Total	5,257,512	6,300,198

The quantity of pit coal transported in 1897 increased 14.8 per cent., principally owing to the increase by 23 per cent. of the quantity transported from the Donetz basin. This gain was caused by the demands on the part of metallurgical factories. Besides, many of the railroad lines, such as the Moscow-Kazan and the Southwestern, began to use mineral fuel instead of wood. During the spring, the Marine Department decided to substitute at the Kolpino factories Russian for English fuel. This created a considerable demand for the Donetz coal. The Polish basin also exported 6.5 per cent. more coal than in 1896.

The transport of petroleum products increased in 1897, compared with 1896, by 10.7 per cent. This was caused, first, by the annual increase of the consumption of that fuel, and, secondly, by the fact that the water of the Volga was very shallow this year, which required shipments to be made by rail.—Consular Reports.

A Taper Rail.

Mr. W. G. Curtis, Engineer Maintenance of Way of the Southern Pacific Company, has sent to us a blue-print of a taper rail designed and patented by him. This has been adopted for general use by the Southern Pacific Company, its application being in places where it is necessary to connect rails of different heights and shapes, and it is used instead of step chairs or bent angle plates. It can be made in a variety of ways. The length adopted by the Southern Pacific is 7 ft. 6 in. or one-fourth of a 30-ft. rail. This length was chosen to avoid waste of rail in cutting and to suit the shop facilities, but Mr. Curtis says that a better method would of course be to taper one end of the standard length rail.



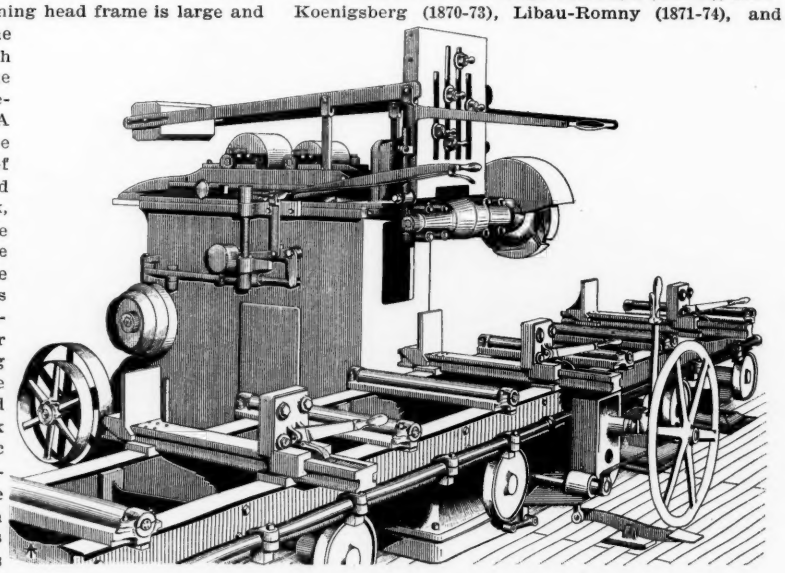
Curtis' Taper Rail.

It makes a somewhat safer and a much smoother riding connection than the devices generally used. The gage side of the head is, of course, kept straight. In the patent specification Mr. Curtis says that the rail is reduced at one end by heating and forging and formed to the section of the smaller rail by the use of dies, or by planing or other process. We are not informed as to the process used by the Southern Pacific. The engraving herewith shows the result.

Carse Automatic Car Gaining Machine.

The gaining machine herewith illustrated is the latest design of the S. A. Woods Machine Co., South Boston, Mass., and is believed to be the heaviest of any now built. The gaining head frame is large and rigid, and carries the heavy head mandrel with two long bearings, the one next to the head being of extra length. A new arrangement on the handle arms permits of adjustment of the head for extremes of work, placing the long handle within easy reach of the operator at all times. The belt driving the head is extra wide, and is constantly kept at proper tension by a traveling tension carriage on the head carriage. The feed of the head, to the work and return, is automatic when the feed lever is depressed, and can be quickly changed in length of travel by moving the stops

There are three changes of feed, thus making a saving when there is a large range of work.



Carse No. 3 Automatic Car Gaining Machine.

The timber carriage is framed of heavy steel beams, and has very powerful and readily moved clamps. The back pieces are easily adjusted and locked by merely tipping them and placing where desired. The frame is planed true, so that the clamps or rollers can be placed at any point as the work requires. The feed of timber carriage is by power or by hand, as shown in the cut. The power feed is easily controlled by the hand lever, and has two speeds. The stops on the carriages are on a steel shaft and consist of split collars. The stops are worked by the foot lever. The floor stands are levelled by the levelling screws on the false bed, which rests on the floor. The maximum length of travel of the head is 24 in., and has a clearance of 20 in. above the timber rolls.

The above may indicate to those interested the make-up of the machine, and the nature of the work to which it is adapted. Further information may be secured from Mr. David B. Carse, Manager of the Car Department of S. A. Woods Machine Co., 64-66 Wabash avenue, Chicago.

Railroads in Russia.*

Russia was the last of European countries to introduce railroads. Leaving aside the St. Petersburg-Tsarskole Seto road, which served the purposes of court travel from the winter to the summer residence, rather than any general economic interests (its entire length being but a few miles), the building of the great trunk lines, such as the St. Petersburg-Warsaw-Vienna, or the St. Petersburg-Moscow, and the entire group of railroads with Moscow as their center, dates back to the sixties only. The length of roads opened for operation during the quinquennial periods, beginning with the year 1838 (opening of the St. Petersburg-Tsarskole Seto line) is shown by the following table:

Years.	Miles of Road Opened During 5 Years.
1838-42	16
1843-47	211
1848-52	393
1853-57	106
1858-62	1,326
1863-67	1,076
1868-72	5,838
1873-77	4,324

The era of railroad construction proper begins, as is seen by this table, only after the Crimean war, which brought home to Russian rulers the one at least important teaching that, to fight or even hold its own against Europe, the country must needs fall back upon European methods of production and transportation. The Russo-Turkish war of 1878-79 brought again an almost entire suspension of railroad building: thus in 1879 only 202.2 miles were completed, in 1880, 118, the year 1881 showing the lowest mark, 27.1 miles. The languor continued during the greater part of the eighties; hardly any year (except the years 1885-6) shows a record of more than 663 miles constructed, the year 1891 ending with the low record of 88.8 miles.

Of roads built during the earlier period, first in time are the Warsaw-Vienna and the St. Petersburg-Warsaw lines, built during the years 1845-48 and 1853-62, respectively. These lines were built for strategic reasons mainly, as connecting the capital of the Empire with the most exposed points of the Western frontier. Following in time, though of greater economic importance, is the central railroad system, with Moscow as its starting point. These lines are the Moscow-St. Petersburg (1857-61), the Moscow-Nizhni-Novgorod (1861-62), the Moscow-Voronezh (1862-69), the Moscow-Vologda (1862-72), the Moscow-Kharkov (1866-69), with its branch to Kiev (1868-70), and the Moscow-Warsaw line (1866-71). Next in time comes the construction of roads connecting the black-soil region with its natural outlets, the ports at the Baltic and Black seas: Riga-Tsaritsyn (1861-71), Kiev-Koenigsberg (1870-73), Libau-Romny (1871-74), and Samara-Viasma (1866-71), all of which lead to the Baltic. Simultaneously lines are built, connecting each one of the more important Southern seaports with the agricultural provinces. Chief among them are: The Odessa line, with its branches to Yelisavetgrad (1867-69), and the Bessarabian branch (1871-77), Kharkov-Nikolayev (1869-73), Kharkov-Tagaurog (1869), Voronezh-Rostov (1861-76), and, finally, Kharkov-Sebastopol (1869-75).

During the eighties the character and method of construction of the newly built roads changed abruptly. In place of the former trunk lines, connecting the black-soil area with the seaboards of the Baltic, Azov and Black seas, and also with the central industrial region around Moscow, these years witnessed

* The figures in this article cover Russia in Europe and in Asia, but do not include Finland.

the construction of great strategic roads, as the Transcaspian (890 miles), the Polessye railroad system (956 miles), besides roads primarily destined for the service of relatively small industrial regions (Catherine line, Ivangorod-Dambrovo lines). Moreover, the system of granting away franchises (concessions) was superseded by the building and working of roads directly by and on account of the state. At the same time the redemption of great railroad systems was going on, so that for some time it seemed as if all private roads were going to be acquired by the state. By the year 1894 the length of state railroads balanced pretty equally that of private roads (8,625 miles, as against 9,431 still under private management). For the year 1897 the "Bulletin Russe de Statistique Financière" gives 15,848 and 8,228 miles, respectively.

The adverse years 1891 and 1892 marked a turning point in the policy of railroad building. Professedly "in order to give employment to the starving peasantry," the Government undertook and encouraged the construction of new roads. A new era began, which in its vigor soon surpassed anything seen, not only in Russia itself, but anywhere in Europe. While in 1891 only 88.8 miles were opened for traffic, the succeeding boom is shown by the following figures:

In 1893	opened	for	traffic	1,063.4 miles
" 1894	"	"	"	1,292.1 "
" 1895	"	"	"	1,164.8 "
" 1896	"	"	"	1,540.8 "
" 1897	"	"	"	285.1 "

(Figures given by W. G. Mikhailovsky in the publications of the St. Petersburg Economic Society.) This includes roads built not only by the state, which has now on hand about three thousand miles both in Europe and Asia, but also the activity of corporations, which now almost surpasses that of the early seventies, when the construction of roads, for some time at least, became the monopoly of a few private companies. Franchises are eagerly contested by competing corporations, a fact unheard of until recently in Russia, where the state not so very long ago had yet to guarantee the interest on the stock and bonds of the chief railroad corporations; the Ministries of Finance and Transportation have in the latest years been swamped with petitions coming not only from railroad and construction companies, but also from representatives of "local interests," as mining, manufacturing and agricultural groups. Among lines projected there figure such important ones as St. Petersburg-Viatka, Moscow-Ufa, St. Petersburg-Kiev, Orenburg-Tashkent, of which the last only is to be constructed by the state.

That you may judge of the rapidity with which railroads have been built of late, it is enough to state, that whereas in 1891 the entire length of railroads (under state and private management) amounted to 19,064, the mileage calculated now (Jan. 1, 1898) comes near 27,448 miles. This does not include 6,115 miles of roads under construction, or for which franchises have been granted. It will be seen that Russia will soon have a greater mileage than any other European country; even now the mileage of its roads is inferior only to that of Germany (28,882 miles during 1895-6), surpassing that of France and Great Britain.

It appears, then, from this short review of the growth of the Russian railroad system, that the railroads served at first mainly the interests of the foreign corn trade, the beginnings of which date back to the time of the Napoleonic wars, when agriculture became temporarily and partly ruined in many parts of Europe. But simultaneously with the construction of the great seaboard lines, the sixties and seventies witnessed also the opening of lines that converge in Moscow. Nearly all of them near their common center pass through industrial regions, whose population even then did not produce sufficient food for its own support, and began to depend more and more for its subsistence upon foodstuffs brought hither by the new railroads from the purely agricultural region. Russian industry, as the cotton industry of the Moscow-Vladimir district, if not owing its origin, surely owes its rapid growth, to the railroads. The transportation of coal, naphtha and mining products soon made a constantly growing share of the entire freight traffic. Whereas in 1874, according to the calculations of a well-known Russian statistician, breadstuffs constituted over 40 per cent. of the entire freight traffic, the proportion for 1895 was but a little over 20 per cent. (the same holds true of the water-routes). And all this, notwithstanding the fact that the transportation of foodstuffs has increased over 85 per cent. during the last 20 years. The mining and iron industry, owing to the improved transportation facilities and the influx of foreign capital, has developed by leaps and bounds. In about seven years the production of pig-iron doubled (about 2,000,000 tons for 1897), almost equaling that of France. The output of coal exceeds now 10,000,000 tons, having been less than 1,000,000 in the year 1872. Such a rapid development would have been quite impossible but for the equally rapid growth of railroads.

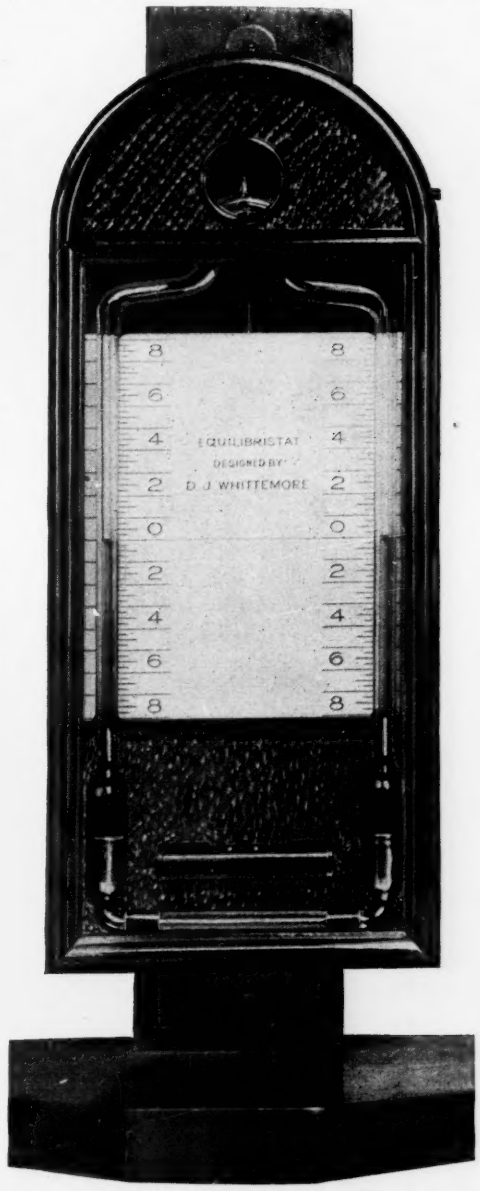
Another interesting feature of Russian railroad growth ought to be mentioned—the tendency towards concentration and consolidation of railroad property under private management. Instead of 44 private corporations, that managed all the private roads in 1886, there are now 17 only left, of which seven control 11,103 miles, 89.2 per cent., of all the 12,452 miles now under private management or construction, just as in the United States consolidation is proceeding at a more rapid rate than the extension of the railroad system. These modern tendencies contrast strongly with the backward state and apparent decay of Russian agriculture. If these tendencies prevail for some time to come, and there is good reason to suppose that they will (the Novoie Vremia has it from a well-informed person that the Ministry holds under advisement the construction of about 23,868 miles), the old popular notion of Russia, as an exclusively agricultural country, will have to be dropped.

The Equilibristat.

Mr. D. J. Whittemore, Chief Engineer of the Chicago, Milwaukee & St. Paul, in a paper entitled "The Equilibristat," read before the Western Society of Engineers, Sept. 7, describes an instrument which he has designed for determining, while riding over the road, the difference of elevation between the opposite rails of the track and whether the outer rail on curves is properly elevated for a given speed; it can also be used to determine approximately the grades.

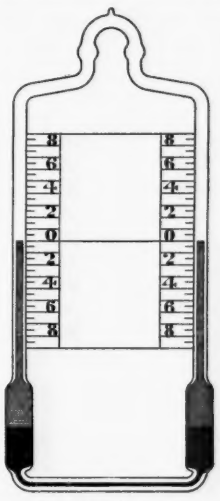
It is a small instrument, as shown by the engravings, which can be placed in a passenger car or attached to a hand car or velocipede, and consists essentially of a U-shaped glass tube partly filled with mercury, above which in either branch is a small amount of colored alcohol. The branch and connecting tubes are reduced in caliber so as to make the instrument less sensitive to small changes in level. When placed on the car floor transversely with the track, any marked difference of elevation of the two rails is shown by the variation in height of the liquid columns. A suitable scale is placed behind the vertical tubes, so that the variation in the surface of the track in inches is directly indicated by the change in height of the liquid in the tubes.

Should the car be at rest on a curve, which has its outer rail elevated above the inner rail by an amount



Whittemore's "Equilibristat."

required to meet the demands of centrifugal force due to a given velocity of train, the difference in height of the columns will be an index to the superior elevation of one rail above the other; but when the car is moving along the curved track at the uniform velocity for which the outer rail is elevated, the fluid will be of the same height in the branches of the tube as if the car were on a straight track with the opposite rails in the same level plane. When passing over a truly circular curve at a higher or lower uniform velocity than that for which the curve is elevated, a close approximation to higher or lower speed can be determined by observing the position of the columns above or below zero. Mr. Whittemore has carefully studied the proper form of tube to use, and his paper contains recommendations in considerable detail as to the best construction.



The Equilibristat.

In regard to his practical experience with this instrument, and its usefulness, he says, in part: "It is notorious that a curved track having its outer rail elevated so that a train passing over it at a certain desired and uniform velocity will be in equilibrium, does not remain so elevated for any considerable length of time. Heavily loaded freight trains passing over such a track at slower speed throw a preponderance of weight on the inner rail, thus causing it to settle in the yielding ballast more than the outer one; again, traversing the curved track at a higher velocity than that for which the track was adjusted brings a preponderence of weight on the outer rail and tends to depress the same in the ballast more than the inner rail, hence changes occur that should be corrected from time to time. When properly placed and adjusted in a business car the instrument will afford valuable and accurate information to the manager, superintendent or engineer of maintenance of way as to the condition of the track in respect to undue or insufficient elevation of one rail over its opposite; and again, when the device is properly placed on hand or velocipede car, or a vehicle constructed for the purpose, and passed slowly over the track, the roadmaster, inspector of track or section foreman can readily observe the transverse conditions of the track passed over more accurately and at less trouble and expense than by the prevailing methods. I have made repeated trials of the device, the last extending over about 800 miles of railroad, on some of which curves ranging from 3° to 8° were passed over, many of which were known to have outer rails elevated properly for the speed at which they were traversed, and in every such instance the instrument registered approximately zero, as it should. In trial one of the first evidences it affords is that curves should be spiraled and that the super-elevation should be made on and in degree as the spiral approaches the degree of the curve which it subserves. From my observations I find that the varied loading which will occur through change of position of six or eight adults in a business car does not appreciably affect the accuracy of the instrument, but high side winds undoubtedly would do so.

"This instrument will be found useful in detecting erroneous alignment of curved track. On some lines curves have not been re-centered instrumentally since the original construction of the railroad, and in the meantime, through various causes, lateral displacements affecting the alignment have occurred, making it sharp in some places and flat in others. On such a curved track, adjusted for a uniform speed as originally laid, the instrument will certainly indicate the errors of alignment by undue fluctuations caused by changes in centrifugal force, and determine at once that the curved track should be instrumentally adjusted."

Criminal Responsibility for an Accident.

On the evening of the 27th of June, 1897, the station at Kolomea and its vicinity in Galicia was visited by a terrific thunder storm, accompanied by torrents of rain. An excursion train arrived at the station at about that time. A general panic seized the passengers, some of whom refused to go farther and demanded their money back; others were anxiously questioning the train and station men, while still others, in their terror, were saying their prayers. The general demoralization extended also to the railroad employees. All the signal apparatus was disabled on account of the storm, and could not therefore be used to warn trains. The whole region about Kolomea was overflowed and the tracks for some distance from the station were under water. These statements give but a faint idea of the terrific violence of the storm. Before it was ended, or it had been ascertained whether damage had been done to the roadbed, the excursion train was sent on, and shortly after, while crossing a stream, the bridge broke down, having been undermined by the violent current, and a part of the train was precipitated into the chasm below, whereby nine people lost their lives and many more were injured. There were brought before the courts during the month of July two officers and an employee of the railroad company, charged with criminal negligence of their duty to the public and the company. The train dispatcher was complained of, because he did not hold the passenger train at the station and before allowing it to proceed, send out a pilot train ahead, or cause a careful examination to be made before using the track, and because he did

not consult the station agent, but acted solely upon his own responsibility. The depot master was charged with violation of the company's rules in placing in the position of watchman an employee who could scarcely read or write and who was not properly instructed in his duties, or had the knowledge of the rules which is to be presumed of every employee connected with the train service. This watchman was also complained of because he did not examine the defective bridge and discover the injury before the train passed over it. The two former officers were found guilty and sentenced to two months in prison at hard labor, while the watchman was discharged, on the ground that his grade of intelligence and his education did not render him capable of appreciating the responsibilities of his position, and that he was not properly instructed, and therefore should not be held responsible for the neglect of the proper precautions to prevent it.—Zeitung des Vereins, etc.

This proceeding, it will be observed, is quite independent of the claims against the company for damages by the injured persons, and the legal responsibility for damages of those who were guilty. This action is taken by the state in the interest of public safety, and appears to be without a parallel in this country. If railroad officers here were held to this kind of accountability, positions in railroad service would perhaps not be so eagerly sought after by those who are not properly trained to the duties required. It is true that in Massachusetts and some other states there are laws which give the Railroad Commissioners or other authorities power to institute criminal proceedings against employees who in their judgment are guilty of culpable negligence, but conviction would be very difficult to secure in the absence of an undoubted criminal intent.

Railroad and Engineering Exhibits at the Paris Fair of 1900.

The general classification of the exhibits at the International Exposition of 1900 at Paris is now known. There are to be 18 groups of exhibits, and the whole exhibition is divided into 120 classes. Groups 4, 5 and 6 are of most interest to the engineering world; they embrace railroad, electrical and mechanical appliances, civil engineering, etc. We give them below with their class number in each group:

Group IV.—Mechanical Apparatus and Appliances.

Class 19: Steam Engines.

Furnaces and chimneys for boilers. Steam generating apparatus for motive purposes: boiler fittings and accessories. Alimentation appliances. Alimentary heating and drying apparatus. Canalization of steam; pipes, cocks, tubes. Stationary, semi-stationary and locomotive engines. Distribution. Consolidation. Regulators and moderators. Greasing apparatus and accessories. Engines other than steam engines. Associations of owners of steam engines.

Class 20: Various Motors.

Hot air, gas, petroleum, compressed or rarefied air, ammoniac, and carbonic acid gas motors. Parts and accessories of these motors. Hydraulic rams: wheels, apparatus for lifting water. Wind mills. Horse gear, barrels, spring motors, treadles, etc.

Class 21: General Mechanical Apparatus.

Mechanical transmitting apparatus: driving shafts, slide rests, articulated systems. Driving wheels. Spur wheels. Nippers. Pulleys, belts, transmitting cables. Incline systems. Regulators and throttle valves. Greasing appliances. Apparatus for mechanical measurements, Meters, registering machines, indicators of speed, steam gages, dynamo meters. Weighing apparatus. Machinery for trials of materials. Apparatus for gaging fluids. Machinery for handling heavy loads: cranes, elevators, etc. Hydraulic elevators: hand and steam pumps, rams, etc. Fire extinguishing apparatus and all appliances used by firemen. Hydraulic presses. Appliances for piping water. Appliances for the compression and the piping of air. Ventilators. Transmission to long distances and distribution of power by water, steam, air or by the vacuum. Apparatus and appliances for the prevention of accidents to machinery.

Class 22: Machine Tools.

1. Machine tools for working metals. Machines for dividing and pressing: steam hammers, trip-hammers, drop forging and swaging machines: planing, drilling, slotting; turning, shaping; milling; pinching; cutting; soldering machines. Machinery for working sheet iron. Tools used for brazing, welding; heating, letting back; hardening; cementing. Forge and engine tools: anvils, breaking anvils, vises, hammers, stamps, chisels, etc. Sharp edge tool machines; lathes, drilling, taps, plating, boring machines. Saws for metals; planing, sloting, grooving machines. Special tools for these machines. Vises, appliances for carrying tools and accessories for machines. Machines in which such matters as sandstone, emery and diamonds are used as tools. Grinding, polishing, sharpening, rectifying machines. Grindstones and emery grindstones. Corundum and diamond tools. Accessories of these machines and grindstones. Apparatus and appliances for hand-work: vises, files, bores, taps, diestocks, etc. Process and appliances for planing, fitting or verifying: marble slabs, rules, squares, compasses, etc.; callipers, gages, ribs, comparers, verificators, regulators of forms and sizes.

2. Machine tools for working wood. Sawing machines, with gang saws, hand saws, circular saws. Planing, sawing, veneering, grooving, mortising, tonguing, cutting, molding, stamping, carving machines. Accessories for these machines. Special tools for machines for working wood and also for hand working.

3. Machine tools of various descriptions other than mentioned in above classes.

Group V.—Electricity.

Class 23, Machines and Appliances for Producing and Utilizing Electricity; Class 24, Electro-Chemistry; Class 25, Electric Lighting; Class 26, Electric Telegraphy and Telephones; Class 27, Various Applications of Electricity.

Group VI.—Civil Engineering—Transportation.

Class 28. Machinery, Apparatus and Appliances of Civil Engineering.

Building material (other than wood, material extracted from quarries, metals and ceramic products): Lime, cements, mortar, artificial stones, etc. Machinery and methods for the production of these substances. Methods for testing materials used in building. Machinery for working materials used in building: Tools used by stone dressers and carvers, by masons, carpenters, locksmiths, plumbers, tilers, glaziers, painters, etc. Machinery and appliances for working on foundations: Hand tools, excavators, dredges, wheelbarrows, carts, wagons, etc. Machinery and appliances for foundation work (other than pumps): Bells, piles, screw stakes, pneumatic apparatus, etc. Machinery and appliances for transporting and removing substances. Machinery and appliances for keeping roads, streets, public promenades, etc., in good order. Apparatus for lighting seacoasts and beacons. Apparatus and appliances for distributing water and gas (gas meters excepted.) Machinery and appliances for pneumatic telegraphy.

Class 29. Models, Plans and Designs of Public Works.

Roads and other public thoroughfares on land. Bridges and viaducts. Interior navigation: Improvement of rivers, construction of canals: dams, locks, elevators, fixed and movable bridges, reservoirs and feeding trenches, mechanical towing, implements used in river ports. Maritime ports, general arrangement: Piers, docks, locks, movable bridges; all implements used (excepting floating appliances). Maritime canals. Appliances for lighting coasts and beacons. Work of protection against the invasion of fluvial or sea waters. Railroads compared with the plans and works of arts. Works in connection with railroads in cities. Works for supplying water for sanitary improvements, drainage and lighting cities by gas. Telegraphic systems by compressed air. Statistics, and special plates and various publications referring to public works. Works of the universal exposition of 1900.

Class 32: Railroad and Tramway Materials.

1. Standard gage railroads; narrow gage railroads. Superstructure: Platform, ballast, etc.; ties, rails, cushions, mats and general equipments; methods for switching; models of railroad stations; trucks; turning bridges; weighing machines and various devices; fixed signals, systems and appliances employed to insure safe traveling; water supply; fixed appliances against snow; appliances used on the lines. Railroad equipment and attraction: Locomotives, tenders; passenger cars and carriages; freight cars; apparatus and detached pieces; brakes; intercommunication of trains; engine-houses; building and repair shops; snow-plows; speed indicators and registers; dynamos; registering apparatus; models for laboratories. General train management: Time-table arrangement; distribution of rolling stock; cleansing and disinfecting devices; signaling and various systems employed to insure safety of travelers; traveling department, tickets, ticket cases, bill posters, fares; freight handling, cost; plans, methods and tools employed for freight handling machinery and their maintenance.

2. Other railroad systems: Grip, funicular, elevated sliding railroads; movable platforms, etc. Railroads: Methods of operating, motive power, equipments.

3. Tramways: Various types of tramways employed on different kinds of roads; systems for switching; appliances for putting down and cleaning lines, etc. Appliances for turning tramways. Cars and omnibuses operated by horse-power; horseless locomotives and carriages; rolling stock and equipment for tramways operated mechanically; brakes and similar appliances; apparatus for producing power that may be stored (hot water, compressed air, electricity, etc.).

4. Methods of transportation similar to railroads. Transportation of boats on railroads, etc.

5. Railroad bibliography. Statistics, special maps, and various publications connected with railroads.

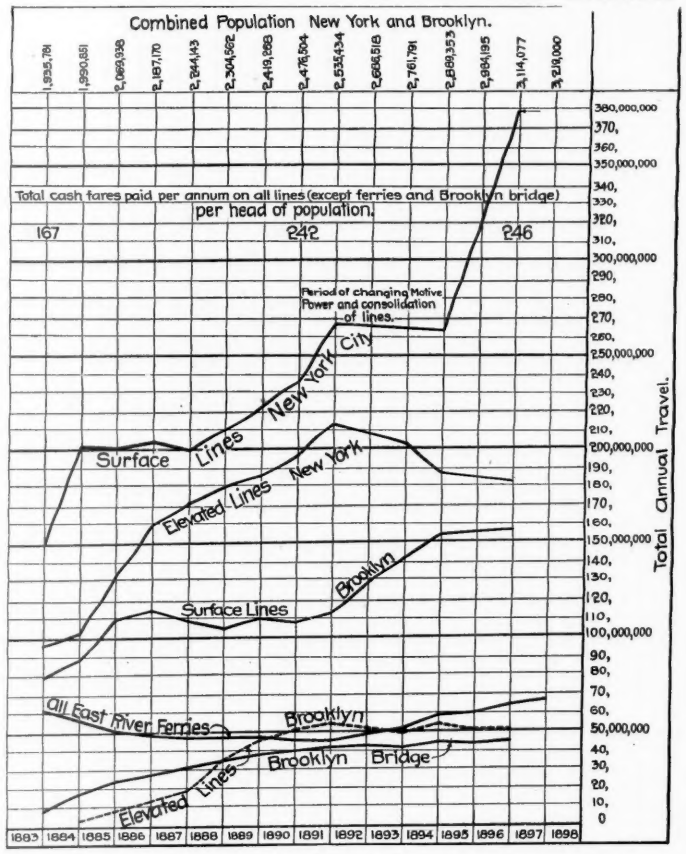
Class 33: Equipment for Mercantile Navigation.

Group 11 (Class 62), Mines.—Metallurgy, shows the working of mines and stone quarries, also machinery, methods and products.

Passenger Travel in New York City from 1883.

The accompanying diagram, for which we are indebted to Mr. W. H. Baldwin, President of the Long Island Railroad, should afford a profitable study for those interested in the problem of street railroad travel. The diagram was compiled and plotted by Messrs. Jacobs & Davies, 32 Nassau street, New York, from official statements.

The jump during the last five years in the travel of the surface roads in New York, as shown by the up-



Passenger Travel in New York City and Brooklyn from 1883 to 1897.

per line in the diagram, will be observed with interest. It is reasonable to suppose that with the change of motive power to electricity and the general improvements on the Metropolitan and the Third avenue roads, this line will continue to rise. It will be of interest to follow these lines for the different roads during the next few years, and to note what direction the line representing the travel on the elevated road will take, in case of the probable rise of the upper line of the diagram.

A study of the different periods as given in the diagram shows that during the first seven years, the total cash fares paid on an average by each person in Brooklyn and New York increased from 167 to 242, while in 1896-97, the cash fares for any one person were 246.

The Industrial Department of the Seaboard Air Line.

As most of our readers know, the Seaboard Air Line has for several years had an industrial department, the object of which is to promote the prosperity of the farmers and villagers along the line of the road, and thus help the transportation business of the company. Vice-President St. John, who established this department, has steadily fostered it from the time of his first connection with the road, and it has accomplished significant results. Noticing recently in a North Carolina paper the statement that the local industrial agents of the road, who, with their wives and other persons directly interested, made up a company of about 150, had held a semi-annual convention, we asked Col. John T. Patrick, the Chief Industrial Agent, to send us an account of the present status of his work, and we give below the substance of his answer.

The object of the Industrial Department is to better the condition of the people along the line, for the purpose of developing the business of the railroad. The bringing in of new people and new manufacturing industries is also a part of its work. To make a start, it was necessary to secure the co-operation of those people whom it was desired to help, and the citizens at each station on the line were asked to designate two men who would be willing to devote a part of their time to carrying out the plans that would be presented by the railroad company. No trouble was experienced in securing the co-operation of the people, and the men who are now acting as Industrial Agents for the Seaboard Air Line work as earnestly as though they were under regular salary. They not only give their time to work at home, but meetings are held, usually about once in four months, at which these agents make their general reports in person, and when plans are considered for new work.

At the first meeting the Chief Industrial Agent outlined a plan for improving the appearance of the surroundings of the towns and villages by planting trees, both fruit and ornamental, and it was decided that the third Tuesday of each March should be Seaboard Air Line Arbor Day. The result of the first year's work showed that the agents had induced the people to set out 75,000 shade trees.

The railroad man who thinks that this should be no part of his work should consider the obstacles encountered in locating people from the Northern states in the South. They are discouraged by the dilapidated looks of things. While Southern farmers can make more money to the acre than can be made in any of the states at the North, a person looking at the condition of the farms would say that there was no prosperity and that no money was being made. The same consideration applies in the towns.

On the fourth of each July there is a "round-up" day for painting and whitewashing. The reports of July, 1897, showed that the agents of the road had induced 700 people to paint their houses, and hundreds of outbuildings and thousands of panels of fences had been whitewashed. The second arbor day report showed that the number of trees planted had increased from 75,000 to over 200,000, and the painting and whitewashing last fourth of July showed a corresponding increase.

The matter of the improvement of the surroundings of the railroad stations is looked after. The Industrial Agents and the station agents cooperate, and out of 100 and odd stations more than 100 have flower plots.

Another thing was to establish a park at each town, whether large or small. These parks are deeded so that they cannot be used for any but park purposes. The outcome has been that at a large number of stations, even some of the smallest, land has been donated and money raised to establish these parks.

The Industrial Agents encourage the farmers to purchase improved agricultural machines, and this has proved a marked advantage.

The road has a herd of fine bulls, the use of which is given to the farmers free. The Industrial Agents communicate with their farmers and the bulls are shipped to the Industrial Agents, and one or more of them, as the farmers may desire, are allowed to stay in that community for 30 days. It is the business of the Industrial Agents to see that only good caretakers get them. Recently five prominent politicians were conversing at one of the small stations, when one of them said to a newspaper man, who has taken a great deal of interest in this industrial work: "Mr. A——, what new scheme has the S. A. L. got up now?" Mr. A. replied: "They have a herd of bulls that they are sending around to the farmers free of cost." The politician's reply was: "Well, we had better close up shop, for that knocks the wind out of our sails. We cannot abuse the railroads any more, for

every heifer calf that is got in a community where the S. A. L. bulls are sent out is worth three votes for the railroad."

Last season the road ran a "Training School on Wheels." A train of cars was fitted up, and everything was put on that could be got together that would be of advantage to the farmers. Expert butter-makers, experts in canning and in road building were secured from the Western, Northern and Eastern states, and the train was started over the road. It stopped at advertised points, where the Industrial Agents had gathered large numbers of people. Each Industrial Agent selected a class of students, 25 women and 25 men, who were to be especially instructed by the experts. These students were taken inside of a large inclosure, which was so arranged that hundreds of people could see what was going on, and they were practically and thoroughly instructed in the arts mentioned. Take, for instance, canning. The two New England women who were employed were directed not to put their hands on anything; in other words, not to do any work; and when the 25 students were taken in hand each was told that she must do every part of the work herself, from the preparing of the fruit to the final completion of everything necessary for its preservation. This arrangement was successfully carried out, and local newspaper comments show that the work was highly appreciated.

Soon after the trip over the line, the road received a large number of communications thanking the management for the work they were doing. Not only that, some farmers sent valuable presents. One progressive farmer, Mr. A. P. Deadwyler, of Georgia, to show his appreciation of what the S. A. L. was doing, made the road a present of a fine Jersey bull to add to its herd. From one of the Southern ladies 10,000 fine strawberry plants were received, to be used at the experiment farms.

The Industrial Agents look up land for sale. They meet newcomers that are sent to their respective places and show them around. Just now, their special work is to induce the farmers to plant walnuts along the public highways and along the private roads through their farms. Another work is to plant a continuous strip from one station to another on the right-of-way of the railroad, of different varieties of grass, so that on either side of the road, from one end to the other, grass suited to the different soils can be seen growing. This is an object lesson not only for passengers on the trains, but also for farmers travelling near the track.

It might be supposed that all this work would cost the railroad company a great deal of money. In addition to what is here outlined, the company has in successful operation over 20 experiment farms on railroad land, where experiments are made with new varieties of grass and grain, and all kinds of fruit trees and fruit-bearing shrubs; with vines, broom corn, hops and all kinds of crops that Southern farmers have not had experience in growing. It took several thousand dollars' worth of fruit trees to start these farms. But the road has simply done this: it has brought all interested parties together in a band of fellowship, each one doing his part to carry forward the general work of improvement. The nurseryman contributes the fruit trees, the seedsman the seeds, the fertilizer manufacturer the fertilizer.

The Section Masters, who look after eight to ten miles of road each, have, many of them, grown children. The Chief Industrial Agent went to the wife of each Section Master and secured her co-operation. She was encouraged to improve her home and surroundings, and was supplied with vines, fruit trees and fertilizers. A competent person goes around from time to time, as may be necessary, directing how to plant and cultivate, how to gather or preserve; and in return for the work done, the company gives the family what is made from the farms. Of course, any good family would be glad to get such an opportunity; so by uniting these different elements, the road has been able to successfully carry out a great work of development.

Neither did the traveling Industrial Training School cost a great deal. The makers of the road machines were glad to furnish experts in building roads and the machinery necessary to do it; and at each point visited a section of good road was built. County Commissioners and the town boards of surrounding towns were brought together to see the work done, and at each town a practical and lasting experiment in road building was left for the benefit of the citizens. In butter making, the manufacturers of cream separators were glad to furnish an expert and the necessary machines and make the experiment. And so on through the entire list, excepting the two New England ladies, who had to be hired to teach domestic economy and the preservation of fruits.

It will be seen that these very gratifying results, affecting a small army of workers, are made possible by the fact that each one sees that he or his community is going to be benefited. The man who volunteers is usually the best soldier, and so it is with the local Industrial Agents. They volunteer to give their services and to do whatever the road asks of them, for the benefit that their communities may derive from their efforts. These agents make weekly reports, and constant interest is kept up by frequent circulars suggesting some new line of work, or something in the way of an experiment. Just now the Chief Industrial Agent is asking the local agents to collect what is called honey locust. It is fruit that grows on the locust tree, similar to the locust that grows in the North. This fruit, if placed on Northern markets, would find sale.

Col. Patrick has worked up public sentiment by all available methods. Local newspapers, as well as farmers' journals and technical publications, have given appreciative notices of the work, and these are widely circulated by the railroad company. The Farmer and Mechanic, of Raleigh, N. C., has published (Oct. 4) a long account of the work, with portraits of a large number of the local Industrial Agents. It is the intention of the management of the road to continue establishing experiment farms until there shall be one for every 10 miles of railroad.

Snow Fences in France.

In the Revue Générale des Chemins de Fer for October, 1897, M. Morard, an engineer of permanent way on the Paris, Lyons & Mediterranean, has an article on snow fences, describing those used by his company in the Jura Mountains, where the snowfall is sometimes very heavy.

Wooden fencing seems to offer the best protection, and three styles have been tried at different times.

The "Russian fence" may be first described. When the snow has fallen to a proper depth a channel is cut in it, parallel to the railroad, and a small wall, Fig. 1, is formed by the snow that is thus thrown up.

A drift quickly forms in front of this obstruction, with a slope m n; the wall is soon overtopped and another deposit with the slope p q is formed on the other side. If the wind still holds in the same direction, a wooden screen, having a height of about 5 ft., is planted on top of the little drift, and this straightway causes the formation of the new drifts m′ n′ and p′ q′, after which the screen is pulled up and set upon the summit of the new drift, and so on to the end of the winter. To provide for high drifts the longitudinal ditch is set back about 100 ft. It was found difficult, however, to set the fences in storms and the plan is not suitable for a mountainous country, where the snow is almost always brought by a sudden tempest, the direction of which is uncertain.

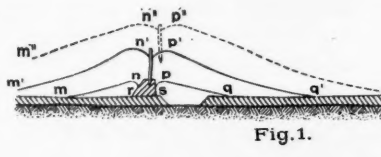


Fig. 1.

Fig. 2.

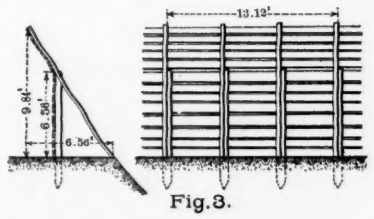
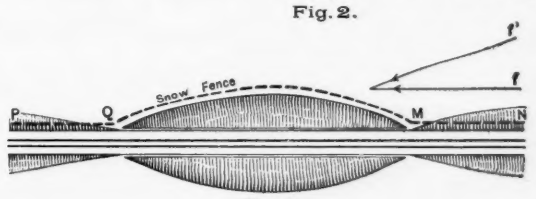


Fig. 3.



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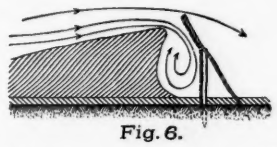
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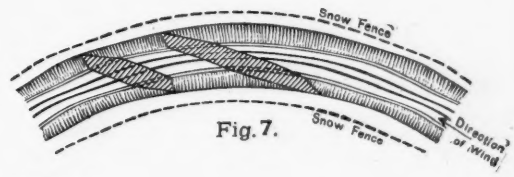

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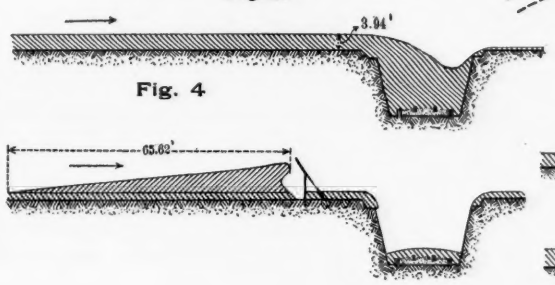

Fig. 4

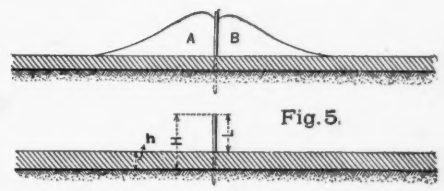

Fig. 5.

Snow Fences on the Paris, Lyons & Mediterranean.

The "English fence" is formed of a solid screen, inclined toward the cut, and supported by vertical feet, as shown in Fig. 2. These have been tried, but they were not made continuous and the track was covered with drifs.

The "Danish" snow fence is shown in Fig. 3. It is an imitation of a snow fence used in Denmark.

This fence has given perfect satisfaction and has been adopted as the standard. Its breadth is small, and it can be placed upon the narrow shelf found at the top of all of the cuts without encroaching upon outside property. The profiles in Fig. 4 were taken from the same cut in two different winters (1889 and 1892). In the first the cut without protection was filled with snow; in the second, the drift is formed in front of the screen, while the cut contains only the snow falling vertically into it. The snow of 1892 would have filled the cut full. This Danish fence has been made from 7 ft. to 10 ft. high on the Paris, Lyons & Mediterranean (higher than is common in Denmark), and it is thought that the satisfactory results obtained are due to this increase of height.

In order that a snow fence may be efficacious, it is necessary that its height should be such that the cubic contents of A and B (Fig. 5), available for the storing of the snow, should not be filled before the end of the storm, for this may be said to be the capacity of the screen. The height of the latter, upon which its capacity depends, should be measured above the top of the snow as it "falls on the level;" an expression which, in the Jura, is understood to be the depth to which the snow would have covered the earth had it fallen in perfectly calm air. If the total "fall on a level" for a whole winter reaches the height h (Fig. 5), a screen of the height H would only furnish a useful height of L=H—h. The capacity is, therefore, a function of this height L, and varies as the square of the same. Sometimes a screen, which has not given satisfactory results, will do so if its height is increased by a few inches.

On the Paris, Lyons & Mediterranean, in the Jura Mountains, it has been necessary to build the fence on the narrow strip of ground lying between the top of the slopes of the cuts and the limits of the right-of-way. The whole of the drift has, therefore, to be put on the windward side of the fence. This fact justifies the comparatively great height (10 ft.), of these fences. In the Jura fence the shape of the windward side has the effect of very slightly decreasing its capacity, for the eddies, which are formed by the overhanging slope, are kept up much longer than when the face is vertical, so that the vacant space fills much more slowly, as shown in Fig. 6. It is not the form of the windward face that keeps the drift away from the line; it is the total height that alone has influence. This form has been adopted simply because it is easily built and set up and is adapted to the situation.

On a curve, Fig. 7, there is some danger of drifts forming on the track, but they will be comparatively unimportant. The moving air merely loads itself with the snow that has already fallen upon the line and is not increased by quantities brought in from the outside. There is more danger from oblique winds, in cases like that shown in Fig. 8. The wind from the direction f′ may carry large quantities of snow to the point where the road passes from a cut to a fill and form a drift there. It has been possible to avoid this difficulty, however, by continuing the fence along the line of the fills M N and P Q.

Fences with a face height of 10 ft. are now located on the top of the slope of the more exposed cuts of the Paris, Lyons & Mediterranean in the Jura Mountains, and results have been noted for several winters. Of course they have not entirely prevented all delays. The fences do not prevent the snow from falling into the cut, but they do prevent the cut from being suddenly filled, thus preventing the movement of the snow plows.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

Since the discussion of the subject of broken stay bolts before the Master Mechanics' Association in 1897, the stay bolts of locomotive boilers have come in for more attention than formerly. It will be remembered that Mr. T. A. Lawes at that time showed conclusively that partially broken bolts could not be detected by the hammer test; in one case where three inspectors in turn examined a firebox and found four broken stay bolts the drilling test disclosed 46 others partially broken. The best practice now is to drill the ends of all stay bolts or use hollow stays, but too much reliance should not be placed upon this means for automatically detecting broken bolts; these holes must be cleaned at frequent intervals or they are useless. Our attention was called to this fact a few days ago by a Superintendent of Motive Power, who had found in cutting out a firebox between 150 and 200 stay bolts wholly and partially broken, and, although these had telltale holes in the ends, none had shown any signs of leakage.

Passenger Classification.

This question, which Prof. Raymond propounds in a letter on another page, is a very large one, not to be disposed of off-hand, and involving some elements the effect of which can be only estimated. The example of India, it seems to us, has very little weight; the circumstances are so different that the development of travel there is interesting to us chiefly as showing a successful adjustment of methods to circumstances.

First of all, India has more than 12,500 inhabitants per mile of railroad; this country, about 385. With 32 times as many people, a density of travel impossible in this country is to be expected, in spite of the fact that most Indians never travel by rail.

But there are other circumstances which make possible the economic handling of travel in such a population as that of India. The trains can be limited in number as they could not be in this country; for little regard need be had to adjusting them to convenient hours. Very likely on the lines from New York to Philadelphia, to Albany, and to Boston, average train-loads of 200 or more could be secured if only three or four trains a day were dispatched; but this would be a great inconvenience to many persons and would not be submitted to. It would waste too much valuable time for passengers. In India the passengers' time is not worth much, and few would pay 10 cents more fare to save two or three hours' time.

But we need not go so far as India to see passengers classified, and the lower classes—by far the larger part of the whole travel—carried at very low rates. All the countries of continental Europe have much lower rates than ours for the bulk of the travel; most of the principal ones have reduced their rates within the past ten years, some of them very greatly, and Germany, the chief exception, is now preparing to begin the reform. The part of the population which cannot pay fares as high as ours is much larger in Europe than here; but the conditions there are very much more like ours than ours, or even Europe's, are like India's. Moreover, the condition of things here more and more approximates to those in Europe. Many parts of the country have a dense industrial population, the chief part of which has a very limited income. People with the same income in Europe would never think of travelling first-class, or even second-class; and there is no question that the factory hand and his like gets his traveling a great deal cheaper in Europe than in this country. It is a matter worth serious consideration, whether something cannot be done for him on our railroads, or on some of them. Something, and in the aggregate a great deal, is done by round-trip, commutation, excursion and other reduced rates; but these, of course, are availed of by the millionaire (unless he has a pass, as is quite often the case), as well as by those whose narrow means compel then to save every cent possible.

It is easy to understand why railroad managers should hesitate to introduce a separate class. The complication, and in many cases the wastefulness, of a system which requires two kinds of accommodation to be provided when in very many cases there are not passengers enough to fill a single car, are inevitable and expensive. Be it remembered that the *average* passenger-train load in this country is less than fifty. Were it required to introduce a fare, say two-thirds of the present rate, on some cars of all trains on all railroads, we suspect that it would be more economical to make the low rate universal and to carry all in first-class cars, rather than to provide two classes of cars and charge the higher rate on the first class. And if we could classify men as we classify goods and charge them according to their ability to pay, it would very likely be cheaper to carry them all in one class of cars, even the first class, in Europe, rather than provide and haul so many different kinds. As it is, we see that the chief English railroads have abolished their second class and now run third-class cars nearly or quite as comfortable as the old second class; while Belgium has just made an end of its first class, which in many countries, so far as can be judged, does not on the whole pay any profit, because the first-class seats are for the most part empty. Some of our railroads have had a slight experience of a similar kind in running sleeping cars, where on a long route for many months together a car has not averaged three passengers per trip.

Again, assuming that a manager of 2,000 miles of railroad is confident that over one of his lines, a hundred miles long, a second class at half first-class fares would pay well on one or two trains a day, would he hasten to introduce it? We think that he would hesitate long first. When we have one train carrying passengers between Philadelphia and New York for a cent a mile and making money by it, and not too seriously reducing the receipts of the other Philadelphia-New York trains, what will the people on the Philadelphia-Pittsburgh line say? And when they have got their cent-a-mile fare, what will happen on the Philadelphia & Erie, where, in not very remote years, the reports showed an average *expense* of something like 3 cents per passenger mile? The railroad managers have to bear in mind the feeling of the public, even when that feeling is demonstrably unreasonable. They will be slow to provide any new occasion for charges of unjust discrimination.

Nevertheless, they may be forced to consider seriously this question of a cheaper rate for passengers. The recent almost universal reductions in Europe, which may be considered on the whole as fairly successful financially, at least not disastrous, and which certainly have been of great advantage to the public, will not remain wholly without effect here. If our railroad system had not been extended altogether out of proportion to the growth of population, a reduction of fares would have been possible before this time. Meanwhile, it must not be supposed that we travel less here than where fares are lower. So far as we have examined the statistics, and at one time or another we have examined those of nearly all countries that report, there is more railroad travel per inhabitant in this country than in any other.

Indictment of Railroad Companies for Nuisance.

The recent indictment of the Long Island Railroad Company for the smoke nuisance brings up some phases of the law that may seriously affect railroads. The indictment was found at the instance of the Health Department of the City of New York, under the statute which defines a public nuisance, prescribes its punishment as for a misdemeanor, and charges the Health Department with the duty of seeing to the execution of the law.

A public nuisance is defined to be a crime against the order and economy of the state, and consists in unlawfully doing an act or omitting to perform a duty which act or omission annoys, injures or endangers the comfort, repose, health or safety of any considerable number of persons or renders them insecure in life or the use of property.

The charge directed against the Long Island Railroad is that in operating its railroad within the city limits it has used soft coal, to the prejudice of the health and comfort of the neighborhood. The indictment is a criminal proceeding, and, in the case of corporations, the direct result is a fine for each offense, if a verdict of guilty is found. If the criminal proceeding is not efficacious in abating the nuisance a civil remedy is permitted, by a suit in equity for an injunction, which in common experience is not easily avoided.

Railroads generally conform to the health laws, even though it may involve considerable additional expense. In some quarters technical defenses may be interposed which attack the constitutionality of the laws, or the application of them, to bodies semi-public in character, authorized to exercise franchises expressly conferred by the legislature. The enforcement of laws designed to preserve the public health rests in the courts upon the inherent power of the state to protect itself, and even in the most extreme cases is justified as a necessary police regulation. This legislation has often been attacked as subversive of the constitutional rights of the individual, but such attacks have rarely succeeded, less in recent times than formerly. Indeed, it is plainly noticeable that the courts are becoming more and more favorable to those laws which are designed to protect the public health, even though they confer executive and discretionary powers unfamiliar to the American mind in other species of legislation. And this favor not only extends to the laws passed by the legislature itself, but also to those regulations known as the Sanitary Code, established by the municipal authorities under general legislative sanction.

The development of case law and statutory law in defining and protecting the rights of the individual is nowhere more marked than in the law of nuisances. Time was when it was thought that the exercise of a public franchise could not be attended by a nuisance; that what the legislature authorized could never be a nuisance; that what under other circumstances would constitute a nuisance degenerated into a harmless act, or, in the language of the ancient lawyers, "an injury without damage," when done directly or indirectly in pursuance of statutory authority. But this doctrine yielded like many another to the silent, but powerful, encroachment of enlightened principles. The advancement of humane civilization reaches to the law as well as to everything else. And civilization means nothing if not the protection of the individual in all his rights. We do not mean to say that there ever was a time in the history of the common law when it did not define and protect some rights in the individual. But they were such as to comprise a small part of what is now regarded as essential to the dignity and happiness of American citizenship. A man might in those times beat his wife with a stick, only on condition, however, that it should not be more than one inch thick; quite satisfactory, indeed, as to the husband, but how about the wife?

That a man had the right to breathe pure air was generally conceded even at the common law. But if it appeared that the air was rendered impure through the exercise of some franchise granted by the King or Parliament the common citizen had to get along as well as he could; it was "injury without damage." No action would lie. Under such law the Long Island Railroad would have continued to use soft coal and make all the smoke it chose, without being called to account by the Grand Jury or anybody else. For the legislature, in enfranchising the road, had impliedly granted to it the right to use all means necessary to enjoy the franchise. And how can a railroad be operated without coal and smoke?

Such, at least, was the argument addressed to the Supreme Court of the United States a number of years ago, when a religious congregation in the city of Washington sought damages against the Baltimore & Potomac for the noise, smoke and soot coming from its yard into the church edifice. But that Court then laid down the doctrine that Congress could not grant any franchise that would take private property without just compensation, even if it had intended that very result; that no such intention, however, could be imputed to Congress simply because it had incorporated the company or had

even specially authorized it to locate its yard in the place it did; that all such grants are necessarily without prejudice to the claims of individuals for compensation.

The right to quietude is somewhat more refined than the right to breathe pure air. And it is because it is more refined that its enforcement has been longer postponed. The law against noise in the operation of railroads is not, perhaps, so highly developed or accurately stated as that against smoke, cinders, soot and noxious odors and gases.

The Society for the Prevention of Unnecessary Noises is the latest of all the prevention societies to be organized, but for all that it will come to the front. Nay, it has already come to the front, having secured, for example, the passage of an ordinance against the barbarous practice of carting long iron and steel shapes in New York City without expedients to prevent deafening noise. The more highly civilized people become, the more refined become their perceptive and receptive faculties. Intellectual culture develops a fine organization, keenly sensitive to physical impressions. With such a people the right to be quiet is as highly prized as the right of personal security. In one form it is the right to enjoy one's home, in another to pursue one's vocation, in another to enjoy one's health. The public will gradually come to realize the necessity and meaning of this right of quietude and to insist upon its being observed. All obscurity of the law on the subject will gradually be cleared up, all uncertainty removed.

Already the trend is in this direction. The wisest of the railroad managers recognize this fact, and are introducing such improved methods and appliances in terminal operations as to render them comparatively unobjectionable from the standpoint of the Health Department. The New York Central has introduced engines into its yard which do their work so noiselessly and inoffensively as not to excite any reasonable complaints from their neighbors. The road which stands out against such a course is the road which will suffer most in the long run.

The vast volume of litigation which the New York elevated railroads have borne the brunt of may serve as an example. While these cases have not proceeded on the theory of a public nuisance subject to indictment, many decisions have been rendered in the course of them which have served the valued purpose of discussing the general question and drawing to it the attention of the public mind.

The courts themselves, of all bodies the most conservative, have had to yield to the force of public opinion, or have been enlightened by it, as the case may be. Gradually receding from the indifference of the common law, they have come to the rescue of the outraged sense of hearing in a way that promises well for the future. Let the railroads profit by their example. Noises that were legally tolerable ten or twenty years ago are legally intolerable now. And those that we submit to now, with hopeless resignation, it will be no part of a patient citizen to bear by the end of the next decade or two. We shall then look in vain for any reason why our lives should be made miserable by the unnecessary racket that torments us now.

The British Board of Trade has issued its fifth annual report, under the law of 1893, which empowers the Board to investigate the hours of labor of railroad employees, when complaints are presented to it. The report contains a list of the 50 cases dealt with during the year ending July 27, with a statement of the action taken in each case. As in previous years, the officers of the Board find that the railroad companies are friendly toward the Board in this matter, and the report says that if the railroad employees do not attempt to extend the scope of the act by trying to secure an increase of wages under the plea of shortening hours, the Board will probably continue to be able to help the men in furthering their reasonable requirements. The question of hours is closely allied to that of wages, but the Board has thus far been able to avoid any difficulty at this point. During the five years in which the act has been in force the companies have made large reductions in hours, and thus far without adversely affecting the wages of the men, certainly not in those reductions which have been made at the instance of the Board of Trade. In the five years the number of cases inquired into has been 451, of which 165 were applications on behalf of signalmen. The Board has steadily set its face against the 12-hour day in all signal boxes on main lines, and also on nearly all branch lines, and, says the report, has thus done a great deal to improve the conditions of the service of signalmen in most parts of the United Kingdom. From shunters there are fewer complaints than might be expected; this is probably due to the fact that the companies deal liberally and sympathetically with this class. It remains true, however, that these men have to work extra hours very often, and there are some cases where they are regularly worked for periods considerably in excess of the booked hours. The men working freight trains are also overworked. In some cases their regular schedules are made so long that any slight irregularity in working the traffic necessitates their being on duty beyond their booked hours. One of the cases reported on was a complaint affecting about 1,500 employees on the North British Railway. The men were not specific in their charges, and the Board required them to give particulars of the excessive hours at a large number of places. After considerable correspondence the road assured the Board that in the future, as in the past, efforts would be continued to reduce the timing of freight trains and increase the provisions for relief of the men when traffic was heavy; but it was maintained that during two months of the year, when the coal trade is heavy, freight trains could not be kept to time. The Board of Trade, however, was not fully satisfied and repeated its demands. Up to the time of making the report the hours of freight trainmen had been reduced at 11 district terminals, and 15 drivers, 13 firemen and 13 guards had been added to the relief staff. Out of the 50 cases, of all kinds, taken up during the past year, 10 were at once adjusted by the companies; in 19 others substantial reductions of hours were obtained; five were deemed by the Board unimportant, nine were pending at the end of the year, and in seven the Board of Trade failed to secure anything for the men. In cases like these seven the Board is always willing to take the complainants before the Railway and Canal Commission, but the employees do not embrace this privilege, for they would be obliged to submit proofs and be prepared to argue their case as in a court.

The Board of Control of the Joint Traffic Association (that is, the presidents of the roads constituting the Association), met in New York on Nov. 4 and voted to dissolve the Association. The resolution which was adopted declared that the Association was formed for the purpose, among others, of aiding in fulfilling the purposes of the Interstate Commerce act, and to maintain reasonable and just rates and prevent unjust discriminations; that the Association had, during its existence, endeavored by every lawful means to cause its members to adhere strictly to the Interstate Commerce law, and that it had kept the Interstate Commerce Commission informed of its action upon all questions; but the Supreme Court having decided that the agreement was in some of its terms in conflict with the Sherman anti-trust law, it was voted that the agreement be cancelled and annulled. The managers were appointed a committee to settle the accounts and obligations of the Association. The presidents, before reaching the decision to abandon the Association, discussed at length the advisability of continuing it under an agreement similar in form to that of the Western Trunk lines and the Southwestern Traffic Bureau; but they evidently concluded that the only utility of these agreements is the means they afford for compiling statistics and revising tariffs, and this work can as well be done by the Trunk Line Association and the Central Freight and Passenger committees, which will no doubt be continued in existence for these purposes.

Chairman Campbell of the Southwestern Traffic Bureau (St. Louis), is now having his turn at notoriety because of the rumpus stirred up by his charges against the Baltimore & Ohio, filed with the Interstate Commerce Commission a few weeks ago. It is a mooted question whether the agreement constituting the bureau contemplated filing complaints against a line not a member of the Association; but there seems to be no doubt that Mr. Campbell has the courage of his convictions. But a public hearing has various uncertainties that a timid person naturally likes to avoid, and Mr. Campbell apparently has some timid associates. At all events, it is now reported that he has notified the Commission that he wishes to indefinitely postpone the prosecution of his charges. The Commission, however, insists on proceeding with the investigation, using all available evidence.

In speaking of the use of the exhaust steam from the air pump for heating the feed water for locomotive boilers, Mr. E. M. Herr, at the last meeting of the Western Railway Club, made a statement which to us seems of considerable importance. First, that every 11° increase in the temperature of the feed-water means a saving of one per cent. of coal, and second that he has found it perfectly practicable to use feed-water heated to 90° Fahr. with the ordinary injector, while one injector with which he experimented could handle water at a temperature of 124° Fahr. In cold weather, by heating the feed-water to about 124° this might easily result in a fuel saving of five or six per cent. without the addition of any complicated apparatus.

NEW PUBLICATIONS.

A Handbook of Engineering Laboratory Practice. By R. A. Smart, M. E., Associate Professor of Experimental Engineering, Purdue University. 12mo, cloth, viii. + 290 pages, 62 engravings. New York: John Wiley & Sons, 1898. Price, $2.50.

This book is primarily intended as a manual for the use of students in experimental work in steam engineering, strength of materials and hydraulics, although it will be found valuable to many in active service. It is particularly free from theoretical considerations, as the class-room can best supply these to the student, and this feature will commend it to many who are in need of a book of directions.

The instruments used for making elementary measurements are explained in the first chapter, with cautions as to their use and inherent errors. These instruments include clocks and watches, speed and revolution counters, tachometers, planimeters, and micrometer and vernier calipers. Separate chapters are devoted to the methods and apparatus used for measuring the flow of liquids, the flow of gases, the measurement of pressure, the measurement of temperature and the description and use of steam calorimeters. The scheme is to give in each case a concise description of these instruments, with an explanation of their use and instructions for calibration, the observations which should be taken and the form of the report. If any formulas are needed to obtain the final results, these are also given. Dynamometers and the measurement of power form a separate chapter.

The treatment of the strength of materials occupies 53 pages, and while being concise it is well done, starting with a description of the essential features of the Riehlé, Emery and Olsen types of testing machines and various extensometers. Then follow definitions of the principal terms used in such testing, the standard dimensions of test specimens and explicit directions to be followed in making different physical tests, including testing metals in the machine for ultimate strength, elastic limit and crushing strength; cross-bending, cold-bending and drift tests; tests of wooden columns, wire rope tests, cement and paving brick tests and tests by impact.

Under steam boiler testing the subjects of boiler efficiency, heating value of fuels and furnace gas analysis are treated, concluding with the standard code of rules for boiler tests of the American Society of Mechanical Engineers. The steam engine indicator is carefully considered, as well as the indicator diagram, all of which is introductory to steam engine testing. Under this heading, valve setting is considered, the determination of cylinder clearance, the steam distribution of the Stephenson link-motion, lubrication of cylinders, etc., and specific directions are given for conducting tests of both single expansion and compound engines. Directions for locomotive testing are given in great detail, as also tests of steam pumps, centrifugal pumps, turbine wheels, impulse wheels, the DeLaval steam turbine, gas engines, air compressors and injectors.

An appendix contains tables useful in working up the results of tests, such as the circumference and areas of circles, decimal equivalents, weights of various materials, with their melting points, moments of inertia of different sections, etc., and tables of the properties of steam.

The Metric System of Weights and Measures. Issued by the Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn., 1898; 196 pages, 3½ in. x 5¾ in.; leather. Price $1.25.

This is a book of tables for converting metric units into English units and converting English units into metric units. It contains tables of equivalent values for measures of length, of area, of volume and of weight, also miscellaneous tables of heat units, foot pounds, horse power, pounds per square inch and kilograms per square centimeter, etc. These tables are conveniently arranged. Each table is on two pages facing each other. On the left hand page, in two columns of 25 each, are the numbers from one to 50, inclusive, with their equivalents alongside, and on the facing page are the remaining numbers up to 100. Thus the conversion of any quantity is very easily performed by properly pointing off the decimals and adding. As to the accuracy of the tables we can express no judgment, not having stopped to test them; but the work of calculating them and of reading the proof was done by Mr. A. D. Risteen, Associate Editor of The Locomotive, who was trained in the Computing Division of the U. S. Coast and Goedetic Survey, and the book is issued with the imprint of a concern which must realize the vital importance of exactitude in such a matter. It has a preface giving something of the history of the metric system and some instructions as to the use of the tables, although such instructions are hardly called for.

TRADE CATALOGUES.

The Edison Mfg. Co., St. James Building, New York City, has issued a 68 page 6 in. x 9 in. catalogue, in which are described the company's medical appliances, X-ray apparatus, projecting kinetoscopes, motor and fan outfits and primary batteries, all of which

bear marks of Edison's inventive skill. The prices of the different apparatus accompany the descriptions. Particular attention is directed to type "Q" primary cell, described on page 12. This battery is designed especially for small fans and gas engine and for signal work on railroads. The X-ray outfit contains a complete list, with prices of all the apparatus necessary for making experiments with the X-rays. This company has perfected as far as possible all of the X-ray apparatus, and the excellent results obtained therefrom should commend their extended use by experimenters.

The Brown Hoisting & Conveying Machine Co.—The Brown Hoisting & Conveying Machine Co. of Cleveland, O., sends us a circular descriptive of some standard commercial crabs and winches. The safety brake on these crabs and winches makes it impossible for the load to run down, and will not lower unless the crank turns backward, the motion ceasing when the cranks are released. These were formerly made by the Yale & Towne Mfg. Co. The circular contains a complete list of the principal sizes, with prices for each.

The E. W. Bliss Co., Brooklyn, N. Y., has issued a pamphlet containing 20 views of its works. The business was started by John Mays in 1866. After passing through various changes it finally became an American stock company with $2,000,000 capital, employing over 800 men. The company is the exclusive maker for the U. S. Navy of the Whitehead-Automobile torpedoes. It aims to supply the most perfect sheet-metal-working machinery and makes tools for the manufacture of an immense variety of pressed and stamped articles.

The Modern Roundhouse Turntable.—We find in this pamphlet, issued by the Westinghouse Electric & Mfg. Co., a description of the Westinghouse turntable "donkey." It will be remembered that this device is similar to the one designed by Mr. George Gibbs for the Chicago, Milwaukee & St. Paul. These power carts, or "donkeys," have been described in detail in former issues, so that a description of them seems unnecessary.

Electric Tramway in Western Australia.

The Perth Tramways Syndicate of London, Eng., has a concession for building a tramway in the city of Perth, Western Australia, and to Subiaco, Leaderville and Fremantle, suburbs of Perth, which, when finished, will have a total mileage of between 30 and 40 miles. At present 10 miles are being built in the city proper, part single and part double track. A second 10 miles will be laid on completion of the first section.

The road will be 3 ft. 6 in. gage, operated by electricity, and all the equipment will be American, with the exception of the 6-in. girder groove rails now being rolled in England. The power plant will be built to develop 2,300 h. p., the first installation to consist of two tandem compound engines of 350 h. p. each. These are now being built by the Robb Engineering Co. of Amherst, N. S. The Babcock & Wilcox Co. of New York City will furnish the boilers, which are to have forged steel headers, and be built to accommodate mechanical stokers, should these appliances be desirable when the plant is running at its full capacity. Goubert feed water heaters and Stratton separators, made by the Goubert Mfg. Co., New York City, will be used. The pumps and condensers have not yet been ordered.

The electrical equipment, including one 225-k. w. direct-connected generator, will be supplied by the General Electric Co., Schenectady, N. Y.

The power plant, as well as the car barn, will be fireproof construction throughout, the latter to accommodate 30 30-ft. cars. An extension to accommodate an additional 20 cars will be added later.

Iron poles for carrying the overhead wires, to be extra heavy and of special design, are now being made by the Pennsylvania Tube Works.

Ten American style 18-ft. closed cars, with cross seats and centre aisle, have been ordered from the J. G. Brill Co., Philadelphia. They will have Brill trucks and special fittings, and G. E. motors and controllers.

Messrs. J. G. White & Co. of 29 Broadway, New York City, are the Consulting Engineers for the road, and buy and inspect the materials.

TECHNICAL.

Manufacturing and Business.

Grain doors and security lock brackets made by the Chicago Grain Door Co. of Chicago will be used on 500 cars now being built by the Wells & French Co. for the Minneapolis, St. Paul & Sault Ste. Marie.

It is stated that the Boston & Maine has placed a contract with J. A. Hurd & Co. for 500 cedar ties.

The Manhattan Paint, Oil & Varnish Co. has been incorporated in West Virginia to make and sell paints, oils, varnishes, building materials, etc. The capital subscribed is $500, with the privilege of increasing it to $2,000,000. The directors are: B. F. J. Kiernan, R. J. Doolan, John L. White, M. J. Cameron and Hubert L. Marsh, all of New York.

The works of the Standard Car Wheel Co. of Cleveland, O., were burned Nov. 5. Three thousand car wheels were damaged.

The Kansas City, Memphis & Birmingham has just installed in the Memphis shops a Carse horizontal hollow chisel mortising machine and a vertical gang boring machine, built by the S. A. Woods Machine Co. of Boston.

The S. A. Woods Machine Co. of South Boston, Mass., has sent us a photograph, which we shall not attempt to reproduce, of its ledgers for the years of 1855, 1856, 1871 and 1897. The great difference in size between the first and last ledger denotes a steadily increased business since the inception of the company. Attention is called to the fact that a planer and matcher, the sale of which is recorded in the first ledger, was taken out of a mill torn down to make way for the new Union station being built in Boston, and again sold.

E. M. Henley and Spencer Hartford, representatives of the Railway Officials' and Employees' Association, made a trip over the Illinois Central lines on a car with a seating capacity of eight people, which was fitted with a cycle motor built by the Sheffield Car Co., Three Rivers, Mich. The party traveled 5,300 miles, at an average speed of 20 miles an hour. One of the Bridge Inspectors of the Chicago & Northwestern stated that he has covered 10,000 miles with a motor car made by this company, and which he has had about a year.

Poor & Greenough, bankers and brokers, 18 Wall St., New York, have opened a Boston office at No. 54 Devonshire St. Mr. Frederick A. Farrar is the resident partner of the Boston firm.

Mr. W. H. Pratt has been appointed Manager of the works of the Universal Construction Co., Chicago.

Messrs. Leach & Simpson, 740-745 Old Colony Building, Chicago, have lately been appointed western representatives of the Corning Brake Shoe Co., Corning, N. Y. They will continue their connections with the U. S. Bronze Co., Cleveland, O.; the Lunkenheimer Co., Cincinnati, O., and the Bass Foundry & Machine Works of Fort Wayne, Ind.

All shops of the Chicago, Burlington & Quincy are now employing full forces of men, and all are running eight hours a day, except the West Burlington shops, which work nine hours. At Aurora 1,000 men are now on the pay rolls.

Iron and Steel.

Newspapers state that another steel rail pool has been formed, and has agreed upon a price of $20 a ton. According to the statement, the companies included are the Federal Steel Co., Cambria Iron Co., Pennsylvania Steel Co., Lackawanna Iron & Steel Co. and the Colorado Fuel & Iron Co.

The Maryland Steel Co. is shipping 3,000 tons of rails to Barbadoes, West Indies.

It is stated that there is an order in this market for 13,000 tons of rails for India.

Samuel A. Benner of the Carnegie Steel Co., Ltd., at Pittsburgh, will represent that company in Mexico, with headquarters in the City of Mexico.

At a recent meeting of the stockholders of the Buhl Steel Co., held at Sharon, Pa., it was decided to issue bonds to the amount of $250,000, the proceeds to be used for making additions and improvements to the plant.

According to press dispatches, the Alabama Steel and Wire Co. has been incorporated with a capital of $2,000,000. A rod and nail mill will be built in Birmingham, Ala., adjoining the Alabama Steel Shipbuilding Co., from whom they will receive the billets, hot. The officers are: E. T. Schuler, President; C. E. Robinson, Vice-President and General Manager; G. H. Schuler, Secretary and Treasurer; all of whom were formerly officers of the American Steel & Wire Co. The contract for designing and building the mill has been awarded to Garrett & Cromwell of Cleveland. The capacity will be 600 tons a day, and the mill will be so arranged that with a slight addition this can be increased to 900 tons in 24 hours. The product of the plant will be largely consumed by export trade.

New Stations and Shops.

We understand that the electric lighting plant of the Merril Railway & Light Company, at Merril, Wis., will be rebuilt on a larger scale.

It is stated that the roads now entering Atlanta, Ga., have agreed to build a new Union passenger station.

Plans have not yet been completed for the new station to be built by the Illinois Central at Champaign, Ill.

The Louisville, Evansville & St. Louis has for some time had under consideration the building of a new passenger station at New Albany. We are advised by the company that nothing definite has been done.

We are officially informed that nothing has been agreed upon yet between the Wabash and the Illinois Central in the matter of building a new Union passenger station at Decatur, Ill. This has been under consideration for some time.

Schlesinger & Mayer will build a new nine-story store in Chicago, 182 by 140 ft., entirely of steel, stone and tile, with outside walls of white marble. Plans are being prepared by L. H. Sullivan, and work will be commenced next spring. The cost will be about $400,000.

Building permits have been issued in Chicago to Stanley R. McCormick for two large brick store buildings, one to be seven stories high, and to cost $300,000, the other to be six stories high, to cost $100,000.

Press dispatches from Sacramento, Cal., report that the shops of the Southern Pacific at that place were destroyed by fire on the morning of Nov. 7, the loss being about $200,000. The fire started in the car and machine shop, and spread to the other buildings of the plant.

The contract for building the new Union station in Sheffield, Ala., has been awarded to Geo. Moore & Sons.

It is expected that the Ottawa, Arnprior & Parry Sound will soon begin work on the passenger station to be built in Ottawa, Ont.

The plans for the new Grand Trunk offices to be built in Montreal, Que., have been accepted by the City Council and call for an expenditure of $400,000. We are advised that contracts for the building have not yet been awarded. W. A. Waite of Buffalo, N. Y., is the architect.

A Heavy Cold Saw.

The reader is familiar with the cold sawing machines made by the Q. & C. Company, designed for cutting rails and other steel shapes. The company has lately brought out what is known as its power sawing machine No. 11, designed for cutting large quantities of steel, ranging in size from 3 in. to 8 in. The blade is 25 in. in diameter and one-quarter of an inch thick, and arbor driven. It is run with from 2½ to 3½ h. p. and makes 11 revolutions a minute. The travel of the saw carriage is 10 in. and the cutting speed $\frac{7}{16}$ of an inch a minute. A series of tests on steel rails showed 160 cuts with scarcely any perceptible dullness of the saw. A special automatic saw grinder is also furnished.

The M. C. B. Association.

Notice is issued that the office of the Secretary of the Master Car Builders' Association and of the Master Mechanics' Association has been moved from Room 974 to Room 774, the Rookery Building, Chicago, Ill.

Output of the Illinois Steel Co.

During the month of October the Illinois Steel Co. turned out approximately 130,000 tons of finished material from its three mills at Milwaukee, Joliet and South Chicago. The material consisted of rails, plates, billets, rods and bars. The mills of the company have been running at about this rate for between two and three months past, the output being larger than before. At the South Chicago works the night shift recently turned out rails for one mile of railroad track in one hour, the rails being 70-lb. of standard section, this being at the rate of about 62 tons per hour. During the same week a day and night shift turned out 3,004 tons of Bessemer steel at South Chicago, the material including only finished material, such as billets, rails and plates, and not ingots. This last record is considered the best by the officials of the company.

The Air-Brake Situation.

The Westinghouse Air-Brake Co. authorizes the following statement in regard to the New York and Boyden companies: The purchase by the Westinghouse Air Brake Co. of the patents and business of the Boyden Brake Co. is the conclusion of a long litigation. These suits, to a considerable extent, involved the right of Westinghouse to the sole manufacture of what is known as the "quick action" brake. By the purchase of the Boyden inventions, which the Supreme Court said were highly meritorious, the Westinghouse Co. still claims to control the situation, although this is contested in the United States courts by the New York Air Brake Co. The Westinghouse Co. has been successful in compelling the New York Co. to cease making three different forms of brakes, and claims that a fourth one now put on the market is also an infringement of its patents. This question will be determined by the Court of Appeals, probably in November or December, the opinion of the lower court having been favorable to the New York Co. Should the decision be favorable to Westinghouse, then the New York Co. will once more be enjoined, and prevented from making its present style of brake. The Westinghouse Co. has brought three other suits against the New York Co.

THE SCRAP HEAP.

Notes.

The New Jersey State Board of Assessors has made up its valuation of railroad property for the current year. The total is $236,464,256, and the amount of taxes assessed against the railroad companies is $1,586,110.

Omaha newspapers state that the Kansas City, Pittsburgh & Gulf has bought from C. B. Havens & Co. 500 box cars, which were built in 1889. Havens & Co. used them in the coal traffic from Rock Springs, Wyo. The reporters learn that the cars have been sold because the Union Pacific is no longer willing to hire cars belonging to outside owners for use in this coal traffic, having a sufficient supply of cars of its own.

James Hathaway and Alonzo Maybury, train robbers, 18 years old, have been tried at St. Joseph, Mo., and sentenced to five years' imprisonment each. Other members of their gang, about 22 years old, were some time ago sentenced to 10 years' imprisonment.

The Georgia, Southern & Florida has notified station agents that agents' clerks must give bonds of $500 each. The blank application sent out for clerks to sign contains a clause stipulating that the clerk will not claim damages against the railroad for wrongful criminal proceedings against him for more than $50, unless wantonness or malice is shown.

Judge Lacombe, in the United States Circuit Court at New York, has decided in favor of the express company in the suit of Simpson (promoted by the Merchants' Association) to compel the express company to pay for the revenue stamp on bills of lading. Judge Lacombe delivered a brief oral opinion in order to hasten the case to the higher courts, to which it will undoubtedly be appealed. He held that there was nothing in the War Revenue act which prohibited the express companies from adding the cost of the stamp tax to the charge against the shipper, and that therefore the action of the express companies in this respect was lawful and proper. He accordingly dismissed the suit.

The Georgia, Southern & Florida has offered prizes of $25 to the farmers for the production of the best acre of corn, the best acre of wheat, of oats and of tobacco; and $50 each for the best acre of strawberries and the best five acres of garden truck. This is to encourage diversification of crops. The competing crops must be raised within five miles of the line of the railroad.

The New York State Railroad Commissioners have approved the application of the Stillwater & Mechanicville Street Railway for leave to cross the Delaware & Hudson track at grade at Third street, Watervliet. The order requires home and distant signals and derailing switches on both railroads in both directions, suitably interlocked, to be worked by a man in a tower at all hours when street cars are running. The expense of construction and operation must be borne by the street railroad.

The shops of the Southern Pacific at Sacramento, Cal., were damaged by fire on Nov. 7 to the extent of about $200,000. It is believed that the fire was started by the crossing of two electric light wires in the car shop. About a year ago the company lost nearly $500,000 worth of patterns in a fire at these shops. On Nov. 7 a fire in a snowshed on the Southern Pacific between Summit and Truckee delayed through passenger train No. 1 about 26 hours, and it was said that the lining of the tunnel at that point was damaged by the flames so seriously that through trains would probably be delayed several days.

South Side Elevated, Chicago.

On Oct. 17 the South Side Elevated completed its first year's use of the Union Elevated Loop, and the October report of the road, recently issued, is the first monthly report permitting comparison with the same period last year, when conditions were practically similar. For the last week of October, 1898, 389,492 passengers were carried, and in the same week of 1897 336,034, a gain for the week of 53,458, or 15 per cent. The total traffic for the year ending Oct. 17 shows a gain of 6,178,498 passengers, or 51 per cent., compared with the preceding year, an increase of from about 12,000,000 to about 18,000,000. The daily average number of passengers for the year was 50,275. The daily average for the whole month of October, 1898, was 58,198, an increase over September of 11,622 passengers per day, or about 25 per cent. The business for October was the largest since the World's Fair, but a large part of this increase for the month was due to the Peace Jubilee week, when 100,000 extra passengers were carried, and when on the one day of the parade alone the road carried 129,450 passengers. During the first 17 days of October, 1898, and before the Jubilee, the daily average was 53,909 passengers, an increase of about 66 per cent. over the same period last year, when the loop was not used. The gain in traffic from the use of the loop is said to have increased the earnings materially, but the installation of electrical equipment last spring was also an important factor in the financial showing, for it has been stated that it has been possible to operate for about 55 per cent. of gross earnings, inclusive of loop charges. The prospect of increased business as the winter approaches is given as a reason for the belief that the end of the year will show earnings of about 3¾ per cent. on the stock.

The Right to Sell Electricity.

In the United States Circuit Court at Chicago Judge Grosscup has dismissed, for want of jurisdiction, the bill of the Chicago General Street Railway Company which sought an injunction restraining the city from cutting the company's wires. The case has been in the Chicago courts since last spring, when the City Electrician, after some controversy, cut the wires by which the company was supplying current to stationary motors in shops. The Electrician, in the State Court, was defended by the city law department, and the Judge decided that no offense had been committed. The railroad company then carried the case to the United States Circuit Court, where the city contended that supplying lumber mills with power was dangerous, opposed to the city ordinance relating to safe wiring and in violation of the terms of the contract.

Lake Notes.

At Chicago last week the steamer Helena arrived one morning with a cargo of 3,100 tons of coal. Within 40 hours the coal was unloaded and the steamer left the river with 102,000 bushels of wheat.

The passenger steamer Pacific, owned by the Great Northern Transit Company, was burned at Collingwood, Ont., Nov. 3. The Grand Trunk Railway freight sheds, filled with goods, were also destroyed. The Pacific was valued at $65,000, and was insured for $25,000. The loss from the burning of the freight sheds will be heavy. The steamer was operated between Collingwood and Sault Ste. Marie.

Ventilation of Hoosac Tunnel.

It is announced that the Fitchburg Railroad is to place a rotary fan at the top of the central shaft of the Hoosac tunnel for the purpose of drawing the smoke out of the tunnel. The fan is to be turned by a 125 h.p. electric motor, which will be supplied with power from North Adams by a wire which is now being put up.

Chicago Drawbridge Accidents.

At Chicago, on Oct. 21, two wagons were driven through open drawbridges into the river, one at Dearborn and one at Randolph streets. Both accidents occurred during the night, when policemen are not on duty at bridges and the red light on the bridge is the only danger signal. It is said that the police force is not large enough to enable men to be stationed at the bridges during all of the 24 hours, but that as a result of the recent accidents men will be kept on duty all night, until some other device for warning drivers and pedestrians is adopted. Many damage suits are pending in the courts against the city on account of accidents at drawbridges.

American Brake Co.

Press dispatches from St. Louis report that a meeting of the stockholders of the American Brake Company is to be held to approve arrangements which have been made for the absorption of that company by the Westinghouse Air Brake Co. At this meeting a vote will be taken on the matter of an agreement with the Westinghouse Air Brake Co. to surrender the lease between the two companies, and to transfer the real estate, machinery, furniture, fixtures and patents of the American Brake Co. covered by the lease to the Westinghouse Co., and to adjust all differences between the companies.

New Fire Boat for Chicago.

The fire tug Illinois, for which order was placed in June, as noted in our issue of July 1, was launched Oct. 29 from the yards of her builders, the Chicago Shipbuilding Company, on the Calumet River. The Illinois is the first steel fire boat built in the West, and has a capacity of 24 streams of water, which can be thrown 200 ft. high, the largest to be 5 in. in diameter. She measures 118 ft. over all, 107 ft. between perpendiculars, 24 ft. beam, 12 ft. 5 in. deep, and will draw, when ready for service, about 10 ft. She will have three sets of double-acting vertical steam fire pumps and two boilers, one to be held in reserve. The pumps were furnished by the American Fire Engine Company, and the boilers by the John Mohr Company. The rest of the boat, including engines, was built at the shipyard.

The Chicago Drainage Canal Litigation.

Judge Hilscher rendered a decision Oct. 28 in the case brought by the Illinois & Michigan Canal Commissioners against the Sanitary District of Chicago, to gain control of the water power formed at Dam No. 1, near Joliet, Ill., and to prevent the Sanitary District from occupying certain lands near the dam, previously sold to the District by the Canal Commissioners. An outline of the circumstances leading up to this dispute was given in our issue of Sept. 30. The decision is virtually that the land in question belongs to the Sanitary District by right of purchase, but that the Canal Commissioners are entitled to any increase in the water power which may result from the building of the Drainage Channel. The case may be carried to the Supreme Court, or the water power purchased by the Sanitary District under condemnation proceedings.

Fall of a Steel Frame.

On Nov. 5 the Wonderland Theatre, a steel-frame building under construction at Detroit, collapsed, burying about 35 workmen in the ruins. Eleven men are known to have been killed, and at least 20 were injured, and the loss is reported at about $100,000. The cause of the disaster is not definitely known. Only the walls, steel work and roof were up at the time of the failure.

New Pullman Cars for the B. & O.

One of the two new Royal Blue Limited trains built by Pullman to run between New York and Washington, over the Baltimore & Ohio, was exhibited at Chicago, Nov. 5 and Cleveland, Nov. 7. These trains are composed of observation, parlor, café, smoking and dining cars, all of which are elegantly finished and fitted with all modern luxuries. The cars are 70 ft. long, with wide vestibules, empire decks, steam heat and Pintsch gas. Each parlor car has 34 seats. These trains will be put in service Nov. 20, and will leave New York and Washington each day at 3.30 p. m.

Scamping a Tunnel.

At Chicago, Commissioner of Public Works McGann on Nov. 4 ordered an investigation of the entire work on the new Northwest land tunnel. A cavity was found over the top of the masonry of section 3, which the contractor received $10 per cu. yd. for filling. The City Inspector in charge of the work has been removed for permitting the faulty construction, and the investigation will be made to ascertain if similar defects exist elsewhere.

The Pacific Coast Limited.

By the invitation of Messrs. Charlton, Townsend, Turner and Goodman of the Chicago & Alton, the St. Louis, Iron Mountain & Southern, the Texas & Pacific and the Southern Pacific, a party of railroad men made a short trip on Friday last from Chicago to Joliet and return with one of the new "Pacific Coast Limited" trains. The train left Chicago at 1 p. m., and luncheon was served in the dining car on the way out. This train consists of a composite baggage and smoking car, a compartment sleeping car, two twelve-section sleepers and a dining car. These cars, which have lately been received from the Pullman Co., have wide vestibules, are richly finished throughout, and are lighted by Pintsch gas. The "Pacific Coast Limited" leaves Chicago at 2 p. m. every Tuesday and Saturday, arriving at San Francisco at 6:45 p. m. every Saturday and Wednesday.

Insurance Department of the Great Northern.

In President Hill's annual report to the stockholders of the Great Northern he states that the company has been operating its insurance department for the past three years, with a saving of $71,255. This amount stands on the books as a credit to insurance. To strengthen this, $250,000 has been transferred to it, thereby making it sufficiently strong to meet a heavy loss.

LOCOMOTIVE BUILDING.

We understand that the Baldwin Locomotive Works have an order to build 25 engines for the Baltimore & Ohio.

The Baldwin Locomotive Works are building two engines for the Leopoldina, of Brazil, and one for the Paulista Railroad.

It is rumored, but not verified, that the Union Pacific has ordered five locomotives from the Schenectady Locomotive Works.

The contract of the Intercolonial with the Baldwin Locomotive Works, calls for 19 compound consolidation engines and one of the same type with Cleveland cylinders.

We are officially informed that the St. Paul & Duluth has not ordered locomotives, as reported by a contemporary, and does not contemplate ordering any at present.

One of the railroad papers last week reported that the Kansas City, Pittsburgh & Gulf had just ordered five more locomotives. We are informed by Mr. Ira C. Hubbell, Purchasing Agent of this road, that this report is unfounded, as the road has not been in the market since placing orders about two months ago for 15 engines. This order was placed with the Baldwin Locomotive Works, as noted in our issue of Sept. 9, and we understand that some of the engines are about completed.

The three consolidation engines ordered by the Long Island from the Brooks Locomotive Works, and referred to last week, are for Dec. 1 delivery and will weigh 160,000 lbs. each, with 144,000 lbs. on the driving wheels. The specifications call for 21 in. x 28 in. cylinders, 51 in. driving wheels; Wootten boilers, with a steam pressure of 180 lbs.; fireboxes, 10 ft. long and 7 ft. wide; tank capacity, for water, 4,000 gals.; for coal, 8½ tons; air brakes, Westinghouse; axles, Coffin process, toughened steel; brake beams, iron; brake shoes, Lappen; coupiers, Standard; injectors, Sellers'; piston and valve rod packings, U. S. Metallic; safety valves, Prince; lubricators, Detroit triple; springs, French, and tires, Latrobe.

In our last issue we stated that the Pittsburgh, Bessemer & Lake Erie would buy seven new engines. The contracts have been placed as follows: Pittsburgh Locomotive & Car Works, one 6-wheel switcher and two consolidation engines; Brooks Locomotive Works, two consolidation engines, and Baldwin Locomotive Works, two consolidation engines. The switching engine will weigh 119,500 lbs. and have 19 in. x 26 in. cylinders and 50-in. driving wheels, with a tank capacity of 3,500 gallons of water. The consolidation engines will weigh 164,000 lbs., with 150,000 lbs. on the driving wheels, and have 22 in. x 28 in. cylinders, 54-in. driving wheels, straight top boiler with 180 lbs. steam pressure; fireboxes 115 in. long and 41 in. wide, and a tender capacity for 5,000 gallons of water and 10 tons of coal. Both types will have Westinghouse brakes, Carnegie steel axles, wood trussed brake beams, Lappin brake shoes, Tower couplers, U. S. metallic valve and piston rod packings, Coale safety valves, Leach sanding devices, Detroit lubricators and French springs. The switching engine will have Richardson balanced slide valves and Ohio injectors, and part of the other engines will have Hancock inspirators and American balanced slide valves, and part Ohio injectors and Richardson balanced slide valves. The engines are for April, 1899, delivery.

CAR BUILDING.

Murray, Dougal & Co. are building 10 cars for Nelson, Morris & Co.

The Wabash has ordered 50 furniture cars from the St. Charles Car Co.

The Southern Pacific has placed an order with the Barney & Smith Car Co. for 1,000 cars.

The Atchison, Topeka & Santa Fe has placed an order with the Wells & French Co. for 250 freight cars.

We are officially informed that the Indiana, Illinois & Iowa is not in the market for new equipment, as reported by a contemporary last week.

It is now reported that the order for the 1,000 cars for the Wisconsin Central, mentioned in our last two issues, will be settled at Milwaukee after Nov. 14.

It is reported, but not confirmed, that the St. Louis, Peoria & Northern has ordered 200 box and 200 coal cars, all of 30 tons capacity, from the Mt. Vernon Car Mfg. Co.

It has been rumored that the Mobile & Ohio would order some new freight cars, but we are officially informed that this road is not in the market for any new freight equipment at present.

The Northern Pacific is considering the buying of some more freight cars, probably 80,000-lb. capacity wooden cars, but we are officially informed that nothing definite has as yet been decided.

The 500 cars for the Missouri, Kansas & Texas, mentioned in our issues of Oct. 14 and Oct. 28, will be built at the Sedalia shops, which are now almost completed. They will be built gradually, to fill old numbers.

The report that the Ohio Southern has placed an order with the Ensign Mfg. Co. for 200 cars is denied by the Receiver, although we had reason to believe that the order had already been given or would be given.

A contemporary last week reported that the Chicago, Milwaukee & St. Paul was building an additional 1,000 cars at its own shops. We are officially informed that this is the same 1,000 which we reported last July.

We noted in our issue of last week that the Pittsburgh, Bessemer & Lake Erie was arranging to order some more steel cars. We are now officially informed that this road is considering 750 flat bottom pressed steel gondola cars of 80,000 lbs. capacity and 350 pressed steel hopper gondolas of 100,000 lbs. capacity, for which orders will probably be closed with the Schoen Pressed Steel Co.

We recently noted an order of the Baltimore & Ohio for 2,000 box cars, placed with the Missouri Car & Foundry Co. These will be of 60,000 lbs. capacity, weigh 32,350 lbs., and measure 36 ft. long, 8 ft. 2 in. wide and 7 ft. 7¼ in. high. The special equipments to be used will include combination body and cast steel truck bolsters, National hollow brakebeams, cast iron brake shoes, Westinghouse brakes, Buckeye couplers, Dunham door fastenings, American continuous draft rigging, Chicago roofs, Baltimore & Ohio 4B diamond trucks, 33-in. cast iron wheels and Baltimore & Ohio standard brasses and doors.

The Canadian Pacific is building 300 box and 60 ore cars at its Perth, Ont., shops, all of 60,000 lbs. capacity. The box cars will weigh 32,000 lbs., and will have frames 35 ft. long, 8 ft. 11 in. wide and 12 ft. 5 in. high from the rails. The ore cars will weigh 24,000 lbs., with frames 22 ft. long, 8 ft. wide and 8 ft. 7 in. high above rails. All the cars will have steel axles, rigid trucks, common sense bolsters, Westinghouse air brakes, Hein couplers, Thornburgh draft rigging, M. C. B. standard brakeshoes, brasses, journal boxes and lids and Canadian Pacific standard springs. The ore cars will have National Hollow brake beams and the box cars Marden brake beams, Chicago roofs and Dunham doors. The road is also considering some new suburban cars, the details for which are not yet definitely settled.

The Northwestern Elevated of Chicago has placed the order for cars mentioned in our issues of Sept. 16 and Oct. 14 with Pullman's Palace Car Co. The order is for 33 motor cars and 114 trailers, to be finished in May, June and July of next year.

BRIDGE BUILDING.

BELLAIRE, O.—It is stated that the Baltimore & Ohio will make extensive repairs to the bridge at Bellaire.

CHICAGO.—The City Council has concurred in the recommendation of the Finance Committee for an emergency appropriation of $13,500 for the immediate repair of nine bridges. (See Oct. 28, p. 783.)

COMBER, ONT.—Bids are being received by Thos. Anderson for two steel bridges over Big Creek, in the township of Tilbury West. Wm. Newman, Engineer, Windsor, Ont.

DAVENPORT, IA.—It is reported that an ordinance was passed by the City Council giving authority to the Chicago, Rock Island & Pacific to build bridges at Third and Fourth Sts.

EVANSVILLE, IND.—The Evansville & Terre Haute RR. Co. has let a contract for a pin-connected bridge, about 100 ft. long, on the line of the Evansville Belt Ry., to replace a combination span. This company has also let a contract for three 60-ft. deck plate girders, to be built over Henry Creek, on the line of the Evansville & Terre Haute, to replace 240 ft. of pile trestle.

FREDERICTON, N. B.—The Department of Public Works has invited tenders for repairing steel bridges at the mouth of the Keswick, the McLeggan bridge at Nashwaak and the Russell Brook bridge in Kent County.

GLASGOW, MO.—The Chicago & Alton will rebuild the bridge over the Missouri at Glasgow. The bridge is about 800 ft. long.

HARRIMAN, TENN.—The Southern Railway will build a bridge over the cut on Margrave St.

LYONSDALE, N. Y.—The town of Lyonsdale will build an iron bridge over the Black River.

M'KEESPORT, PA.—Press reports state that the question of issuing $7,500 bridge bonds will be voted upon at an election to be held in February.

MINNEAPOLIS, MINN.—It is reported that the question of issuing $80,000 of bridge bonds will be voted upon at the November election.

OTTAWA, ONT.—Plans are being prepared at the Department of Public Works for a new steel bridge over the Canada Atlantic Ry. at Maria street, to cost $30,000.

READING, PA.—Mr. Witman, member of the City Council, offered a resolution instructing the City Engineer to make estimates for building a bridge under the Philadelphia & Reading tracks at Spring street.

WASHINGTON, D. C.—Bids will be received by the Commissioners of the District of Columbia until noon, Nov. 22, for building the foundations for bridges across Rock Creek on the lines of Massachusetts and Connecticut avenues extended.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Cleveland & Pittsburgh.—Quarterly, guaranteed 1¾ per cent.; payable Dec. 1.

Atlantic Coast Line of Connecticut.—Stock dividend. 100 per cent.

Chicago & Alton.—Quarterly, common and preferred, 1¾ per cent., payable Dec. 1.

Kansas City, St. Louis & Chicago.—Quarterly, preferred, guaranteed, 1½ per cent., payable Nov. 1.

Manchester & Lawrence.—Five per cent., payable Nov. 1.

Mexican Northern.—Quarterly, 1 per cent., payable Dec. 2.

Lehigh Coal & Navigation.—Two per cent., payable Nov. 28.

Mexican Ry.—First preferred, 2⅝ per cent., payable in November.

Mexican Southern.—One and one-quarter per cent., payable Nov. 1.

Piedmont & Cumberland.—Two per cent., payable Oct. 18.

Baltimore Traction.—One and one-half per cent.

Coney Island & Brooklyn.—Quarterly, 1½ per cent.

West Chicago St.—Quarterly, 1½ per cent., payable Nov. 15.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

American Society of Civil Engineers.—Meets at the house of the Society, 220 West Fifty-seventh street, New York, on the first and third Wednesdays in each month, at 8 p. m.

Association of Engineers of Virginia.—Holds its formal meetings on the third Wednesday of each month from September to May, inclusive, at 710 Terry Building, Roanoke, at 5 p. m.

Boston Society of Civil Engineers.—Meets at 715 Tremont Temple, Boston, on the third Wednesday in each month at 7:30 p. m.

Canadian Society of Civil Engineers.—Meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday at 8 p. m.

Central Railway Club.—Meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

Chicago Electrical Association.—Meets at Room 1737, Monadnock Building, Chicago, on the first and third Fridays of each month at 8 p. m. J. R. Cravath, Secretary.

Civil Engineers' Club of Cleveland.—Meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

Civil Engineers' Society of St. Paul.—Meets on the first Monday of each month except June, July, August and September.

Denver Society of Civil Engineers.—Meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month, except during July and August.

Engineers' Club of Cincinnati.—Meets at the rooms of the Literary Club, 25 East Eighth street, on the third Tuesday of each month, excepting July and August, at 7:30 p. m.

Engineers' Club of Columbus. (O.)—Meets at 12½ North High street on the first and third Saturdays from September to June.

Engineers' Club of Minneapolis.—Meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

Engineers' Club of Philadelphia.—Meets at the house of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month at 8 p. m., except during July and August.

Engineers' Club of St. Louis.—Meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

Engineers' Society of Western New York.—Holds regular meetings on the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

Engineers' Society of Western Pennsylvania.—Meets at 410 Penn avenue, Pittsburg, Pa., on the third Tuesday in each month at 7:30 p. m.

Locomotive Foremen's Club.—Meets every second Tuesday in the club room of the Correspondence School of Locomotive Engineers and Firemen, 335 Dearborn street, Chicago.

Montana Society of Civil Engineers.—Meets at Helena, Mont., on the third Saturday in each month at 7:30 p. m.

New England Railroad Club.—Meets at Pierce Hall, Copley Square, Boston, Mass., on the second Tuesday of each month.

New York Railroad Club.—Meets at 12 West Thirty-first street, New York City, on the third Thursday in each month at 8 p. m., excepting June, July and August.

Northwest Railway Club.—Meets on the first Tuesday after the second Monday in each month at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.

Northwestern Track and Bridge Association.—Meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2:30 p. m.

St. Louis Railway Club.—Holds its regular meeting on the second Friday of each month at 3 p. m.

Southern and Southwestern Railway Club.—Meets at the Kimball House, Atlanta, Ga., on the second Thursday in January, April, August and November.

Technical Society of the Pacific Coast.—Meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

Western Foundrymen's Association.—Meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. A. Sorge, Jr., 1533 Marquette Building, Chicago, is Secretary.

Western Railway Club.—Meets in Chicago on the third Tuesday of each month at 2 p. m.

Western Society of Engineers.—Meets in its rooms on the first Wednesday of each month at 8 p. m., to hear reports and for the reading and discussion of papers. The headquarters of the Society are at 1736-1739 Monadnock Block, Chicago.

New York Railroad Club.

The next regular meeting of the Club will be held Thursday evening, Nov. 7, at 8 o'clock, at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City. Mr. M. N. Forney will deliver "A Short Lecture to Railroad and Supply Men on Conduct and Character."

St. Louis Railway Club.

It was announced that at the regular meeting of the St. Louis Railway Club, Friday, Nov. 11, a paper would be presented by Mr. Willard Beahan, Am. Soc. C. E., entitled, "The Proper Organization of the Engineering Department of a Railroad." The paper read at a former meeting by Prof. R. A. Smart, of Purdue University, entitled "The Performance of a Four-Cylinder Compound Locomotive," will be open for discussion. Mr. S. M. Vauclain, Superintendent of Baldwin Locomotive Works, has prepared a number of stereopticon slides, which he will use in discussing this paper.

Central Railway Club.

A regular meeting of the club will be held at the Hotel Iroquois, Buffalo, N. Y., Friday, Nov. 11. The Committee on Entertainment, consisting of Mr. F. B. Griffith, chairman; Mr. James Macbeth and Mr. J. R. Petrie, have made arrangements for an inspection of the Delaware, Lackawanna & Western and the New York Central shops at East Buffalo. At the afternoon session the following reports will be presented: "Perfection of top-hinged oil-box lids, so as to more completely exclude dust from journal boxes, and the relation of a tight fitting lid to cost of lubrication and number of hot boxes." Committee: C. J. Butler, chairman, E. C. McCarty, J. R. Petrie.

"The most desirable material for driving boxes, and should they be solid, or have a shell bearing?" Committee: E. A. Miller, A. M. Waitt, John Hawthorne.

Discussion will be had on: "Which is the more economical, a single nozzle or a double nozzle, and what should be the ratio between height of nozzle and radius of boiler?" Committee: George W. West, chairman; John Mackenzie, John Magarvey. The report of this committee follows:

I am appointed chairman of a committee to report on which is the most economical, a single nozzle or a double nozzle, and what should be the ratio between height of nozzle and radius of boiler. The time seemed too short to gather such information as would be of benefit to the members of this club. It has been my opinion that there was no economy in the single nozzle over the double, or vice versa, and the information your committee have drawn out from the mechanical departments of our best managed and successful railroads confirms this opinion.

Opinion and practice are about equally divided as to the best results obtainable with the single or double nozzle. The company which I represent had ten engines built by the Brooks Locomotive Works, originally equipped with the double exhaust pipes, the top tips of which were about even with second row of flues from top. We cut the pipes off about four inches, and dropped the netting with the pipes a corresponding four inches. With some of the engines it improved the steaming qualities greatly; others it did not affect in the least. We then tried the Smith exhaust pipe, with which I have no doubt you are all familiar, and which is a single nozzle pipe, and it also greatly improved some engines, and others it did not. We have tried the Master Mechanic on these engines with good success, and I was nearly a convert to the single nozzle.

At our Norwich shop about three months ago our Master Mechanic rebuilt an engine, same class as those previously equipped with single nozzle, both Smith and Master Mechanic, and asked my permission to allow him to use the double nozzle, which was done, and the engine made phenomenal runs. So I am forced to admit that in so far as any data we have been able to gather, both styles and class of nozzle are good when properly designed.

George W. West, Chairman.

Engineers' Club of Philadelphia.

A meeting of the Engineers' Club was held at their rooms, 1122 Girard street, Philadelphia, on Saturday evening last. About 60 members were present. After the business session Mr. Charles Piez, Chief Engineer of the Link Belt Engineering Co., read a paper on "Coal Handling Machinery," after which many views were thrown on the screen showing some of the installations referred to in the paper. He considered the three important classes of coal handling machinery: (1), the continuous type; (2), perfect discharge; (3), gravity discharge, and explained the advantages of each for any particular work. For horizontal conveying he discussed the following methods: (1) screw, (2) scraper, (3) belt, and (4) pan. He then considered somewhat in detail, conveyors for stones. After this paper, Mr. Carl Hering gave some notes on the progress in electrical engineering, referring principally to the introduction of electricity on street railroads and mentioning some interesting modern applications, particularly the Jungfrau Mountain road in Switzerland. After the paper a light luncheon was served in the parlors.

Western Society of Engineers.

An adjourned meeting for the further discussion of papers on "Track Elevation" was held in the Society's hall, Monadnock Building, Chicago, Wednesday evening, Nov. 9, when the following papers were presented and discussed, all being illustrated by lantern slides: "Notes on the Track Elevation of the Chicago, Rock Island & Pacific Ry., and the Lake Shore & Michigan Southern Ry.," by L. H. Clarke. "Pittsburgh, Fort Wayne & Chicago Ry.," by W. H. Coverdale. "Sixteenth Street Crossing," by Major G. W. Vaughn. "St. Charles Air Line," by H. W. Parkhurst. The papers of Oct. 5, by Messrs. Evans, Parkhurst, Webb, Rogers, Reichmann and Bremmer were also open for discussion as far as time permitted.

An invitation from the President and Faculty of the University of Illinois to members of the Society and ladies to visit the Unversity at Champaign on Nov. 11 was accepted. The Illinois Central placed a special train at the disposal of the Society, to leave Chicago Nov. 11 at 9.15 a. m., returning about 10 p. m.

The October number of the Journal of the Western Society of Engineers contains some unusually interesting papers for railroad engineers, while the halftone engravings are also much better than those of previous numbers, thus greatly improving its general appearance. The first paper is by Mr. D. J. Whittemore, Chief Engineer of the Chicago, Milwaukee & St. Paul, and is a description of the "Equilibristat." Mr. R. D. Seymour in the second paper describes the installation of a modern cable-way on the Mississippi River between Minneapolis and St. Paul. Other papers are "Concrete Facing on a Sandstone Bluff at St. Paul," by Mr. Onward Bates, Superintendent of Bridges and Buildings of the Chicago, Milwaukee & St. Paul, and "The Foundations for the United States Government Post Office and Custom House Building, Chicago," by General William Sooy Smith, enginer in charge. An abstract of Mr. Bates' paper was given in our issue of Oct. 7. Then follow descriptions of the track elevation in Chicago, of the Chicago & Northwestern, by Mr. L. H. Evans; that of the Illinois Central by Mr. H. W. Parkhurst, and the Chicago, Milwaukee & St. Paul, by Messrs. W. A. Rogers, Albert Reichmann and G. H. Bremner. These track elevation articles have a particular value as coming direct from the men who superintended the work, and similar articles regarding the work of the other Chicago roads will appear in the November number. The discussion of these papers will also be published at that time.

Railway Signaling Club.

The Railway Signaling Club held its meeting, as had been announced, at Chicago, on Nov. 8, but the first business was the consideration of the resignation of Secretary E. M. Seitz, which was accepted. Mr. C. O. Tilton was appointed Acting Secretary. This matter interfered with the plans for the meeting and the subjects named in the programme were only informally discussed.

Engineers' Club of St. Louis.

The 478th meeting was held Nov. 2, with President Bryan in the chair. Twenty-seven members and four visitors were present. Capt. F. H. Macklind gave an address upon "Roads and Roadways." He pointed out the necessity of good roads to our present civilization and showed how city streets had developed from country roads. A brief history was given of the street making and paving which had been done in St. Louis. The value of various pavements from different standpoints was discussed, and the paper closed by giving the methods used and the cost of cleaning the streets in different cities. A discussion of this subject followed, participated in by Messrs. Bouton and McCulloch.

Prof. Kinealy exhibited a machine for boring triangular, square, pentogonal, hexagonal and octagonal holes. The machine can be used in connection with any drill press, and bores the hole at one operation in about twice the time taken to bore a round hole. The inventor of the machine was introduced to the Club and explained the manner of operating the drill.

PERSONAL

—Mr. W. F. C. Hays, Counsel for the Chicago Sanitary District, died at Downer's Grove, near Chicago, Nov. 1, aged 39.

—Mr. Franklin P. Kearcher, Secretary of the Philadelphia Coal & Iron Co., died in Philadelphia Nov. 5. He was 50 years of age.

—Mr. Robert Lenox Banks, at one time Secretary of the New York Central & Hudson River, died at his home in Albany, N. Y., Nov. 7. He was 68 years old.

—Mr. J. A. Foley, lately Division Superintendent of the Union Pacific, has been appointed General Superintendent of the California Fruit Express, with headquarters at Chicago, Ill.

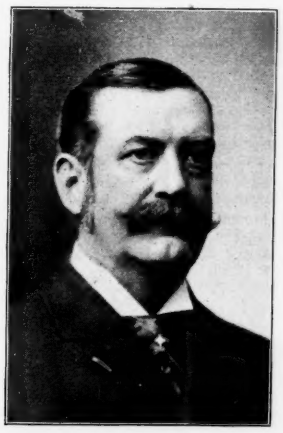
—Mr. John Medway, formerly Superintendent of Motive Power of the Fitchburg, has been appointed Master Car Builder of the Swift Refrigerator Transportation Co., with headquarters at Chicago.

—Mr. Theo. Buskirk has been appointed by Mayor Harrison of Chicago to be Assistant Engineer of the city's Track Elevation Bureau. He succeeds T. P. McDonald, resigned. Mr. Buskirk has been lately connected with the engineering department of the Lake Shore.

—Mr. C. H. Summers, Chief Electrician of the Western Union Telegraph Co. at Chicago, died suddenly of heart disease on Nov. 2 at San Francisco, where he had gone on a business trip. Mr. Summers was born in Kentucky and entered the telegraph service in 1854. He had occupied his position with the Western Union Telegraph Co. since 1869, as Chief Electrician, his territory extending from Pennsylvania to the Pacific Ocean, and from British Columbia to the Gulf of Mexico.

—Mr. Virgil G. Bogue has recently returned to New York from San Francisco, where he has been employed for some months as expert by the Southern Pacific Company in the matter of the suit between that company and the Railroad Commissioners of California relating to freight rates. The Commissioners ordered, some time ago, a horizontal reduction of 25 per cent., and this the company is contesting. The questions covered by Mr. Bogue's study were mostly such as relate to the value of the Pacific System of the Southern Pacific, about 4,200 miles of railroad.

—The election of Mr. Russell Harding as Vice-President of the St. Louis Southwestern has already been noted in these columns. It is not quite two years since Mr. Harding was appointed General Superintendent of the Great Northern, and during that time he has maintained the high standard in executive management set by his predecessors Like many other successful railroad officials, Mr. Harding began at the bottom. His first railroad service began in his father's employ. He served as a paymaster and timekeeper while his father was building a portion of the Portland & Ogdensburg. In 1877 he took a position on that road as station agent, operator and ticket agent, remaining in that capacity for four years. At the end of that apprenticeship he went west and served as an Assistant Engineer on the International & Great Northern of Texas, while that road was being built. Mr. Harding became Chief Engineer and Superintendent of Construction of the same road six years later. His subsequent promotions were noticed in the Railroad Gazette, Oct. 28. Mr. Harding is a New Englander, having been born in Springfield, Mass., 42 years ago.



—Mr. David A. Wells died at his home in Norwich, Conn., last Saturday afternoon at the age of 70. Mr. Wells has long been widely known as a student of and writer upon financial, social and political affairs, and has made a great impression upon the thought of two generations of Americans. All of this is a matter of common knowledge. It is not so well known, however, that he had some direct relations with railroads. In 1876 he was appointed one of the Receivers of the Alabama & Chattanooga Railroad, and succeeded in rescuing that property from bankruptcy. He was also one of the trustees of the bondholders of the Erie Railway, and in 1878 he was selected by the associated railroads as a member of the board of arbitration to report upon pooling and division of earnings.

ELECTIONS AND APPOINTMENTS.

Atlantic Coast Line.—Ernest Williams has been appointed Division Freight and Passenger Agent, with headquarters at Wilmington, N. C., with jurisdiction over the line south and west of Fayetteville and Wilmington. Mr. Williams was formerly Chief Clerk to General Freight and Passenger Agent Emerson. J. W. Morris has resigned as Division Freight and Passenger Agent at Charleston, S. C., and Mr. W. N. Royall, in addition to his duties as Superintendent, has been appointed General Agent of the company, in charge of all traffic matters at Charleston.

Bangor & Portland.—John N. Hoffman has been appointed Purchasing Agent, with headquarters at Bangor, Me.

Chattanooga Southern.—G. A. Odell has been appointed Roadmaster; effective Nov. 7.

Chesapeake & Ohio.—Wm. A. Sullivan has been appointed Assistant General Freight Agent, with headquarters at Richmond, Va. This is a newly created office.

Chicago Great Western.—C. E Slayton has been appointed Division Master Mechanic, with headquarters at Dubuque, Ia.

Chicago, Peoria & St. Louis.—The duties of the office of Treasurer, held by C. D. Moyer, have been assigned to Ralph Blaisdell, Auditor, with headquarters at Springfield, Ill.

Cincinnati, Hamilton & Dayton.—Frank Miller, who has been lately in the employ of the Baldwin Locomotive Works, has returned to his old position as Traveling Engineer of this company. His headquarters are at Lima, O.

Cincinnati Northern.—At the annual meeting held at Cincinnati, Oct. 26, George R. Sheldon resigned as Director. He was succeeded by Walter B. Richey, of Lima, O.

H. A. Kellar has been appointed Cashier and Paymaster, with headquarters at Van Wert, O.

Cleveland, Cincinnati, Chicago & Eastern.—Henry Scott has been appointed Trainmaster on the Peoria & Eastern Division, with headquarters at Indianapolis, Ind.

Coast Railway of Nova Scotia.—The Coast Railway Company have opened an office in Halifax, N. S., with Mr. Martin Van Harligan, Chief Engineer, in charge.

Columbus, Hocking Valley & Toledo.—W. E. Costello, Trainmaster at Columbus, O., has resigned. He is succeeded, for the present, by R. S. Quigley, heretofore Trainmaster of the Ohio River Division.

Dallastown.—The officers of this company, referred to in the Construction column, are: President, D. F. Lafean, York, Pa.; Vice President, J. C. Heckert, Dallastown; Secretary, H. H. Weber, York; Treasurer, C. C. Frick, York; Chief Engineer, S. M. Manifold.

Delaware & Hudson.—John Stranahan has been appointed Traveling Engineer, with headquarters at Oneonta, N. Y.

Detroit & Lima Northern.—E. W. Hiner, General Agent at Lima, O., has resigned. Mr. Hiner was heretofore Assistant General Passenger and Freight Agent at Detroit, Mich. On the appointment of Mr. R. C. Cable as General Passenger Agent, Mr. Hiner was made General Agent.

El Paso & Northeastern.—E. J. Dedman has been appointed Chief Clerk in the office of the General Superintendent, with office at El Paso, Tex. He also has charge of the Purchasing Department.

Emmittsburg.—At the annual election held in Emmittsburg, Md, Nov. 3, W. A. Himes, of New Oxford, Md., was elected President, to succeed Dr. James A. Elder, deceased. Rev. Wm. O'Hara was elected a Director and Vice-President.

Evansville & Terre Haute.—C. H. Griffen has been appointed Traveling Auditor. He succeeds W. K. Allen, who is temporarily in charge of the Accounting Department, made vacant by T. J. Hyman's resignation. (Nov. 4, p. 803.)

Flint & Pere Marquette.—C. M. Booth has been appointed General Agent at Toledo, O., succeeding Mr. Gaines, promoted. (Nov. 1, p. 803.)

Fort Worth & Rio Grande.—J. W. Ravlin has been appointed Superintendent of Transportation, with office at Fort Worth, Tex., succeeding C. H. Stevens, who has been transferred to the office of Commercial Agent, with headquarters at the same point.

Gainesville & Gulf.—L. E. Barker, General Freight and Passenger Agent, has been appointed Acting Auditor, vice W. A. Sanderson, resigned. H. E. Taylor has been appointed Treasurer, succeeding V. J. Herlong. The headquarters are at Gainesville, Fla.

Grand Trunk.—C. S. Cunningham, heretofore Trainmaster at London, Ont., has been appointed Trainmaster, with office at Montreal, Que. He is succeeded at London by H. E. Whittenberger. Mr. Whittenberger was heretofore Trainmaster at Stratford, Ont. (Sept. 30, p. 714.) W. E. Costello, heretofore Trainmaster of the Toledo Division of the Columbus, Hocking Valley & Toledo at Columbus, O., has been appointed Trainmaster, with headquarters at Stratford, Ont. He will have charge of the line from Port Hope to Hamilton, and from Buffalo to Goderich.

Great Eastern.—The officers of this company, referred to in the Construction column are: President, J. W. Lynch, Kinston, N. C.; General Manager, M. J. Macleary, Suffolk, Va.; Secretary, Geo. W. Sugg, Snow Hill, N. C.; Treasurer, J. D. McCormick, New York.

Great Northern.—Frank E. Ward has been selected for the position of General Superintendent, succeeding Russell Harding. Mr. Ward has been heretofore General Superintendent of the Montana Central, with headquarters at Great Falls, Mont.

Intercolonial.—B. C. Gesner has been appointed General Air Brake Inspector, with headquarters at Moncton, N. B. C. W. Price has been appointed Train Dispatcher at Moncton, N. B., succeeding H. B. Fleming, promoted. (Oct. 28, p. 785.)

William Williams, formerly Secretary to Superintendent Rennels at Campbellton, N. B., has been appointed Train Dispatcher, succeeding L. S. Brown, resigned, with headquarters at same point.

Kansas City, Memphis & Birmingham.—The office of Trainmaster of the Birmingham & Memphis Division will be removed from Birmingham to Emory, Miss.

The office of Trainmaster, heretofore located at Birmingham, will be moved to Amory, Miss. A. J. Smith, Trainmaster, is in charge of the office.

Lebanon Springs.—The office of Elnathan Sweet, Receiver, has been removed from Bennington, Vt., to Albany, N. Y.

Lehigh Valley.—P. J. Flynn has been appointed Assistant Trainmaster, with office at Sayre, Pa.

Louisville, Evansville & St. Louis.—A. N. Ridenour has been appointed Assistant Trainmaster, with headquarters at East St. Louis.

Minneapolis & St. Louis.—H. E. Elliman has been appointed Train Dispatcher at Minneapolis. He succeeds Wm. Coyne, resigned. (Oct. 28, p. 785.)

Nashville, Chattanooga & St. Louis.—J. H. Peebles has been appointed General Agent, with headquarters at Chattanooga.

New York Central & Hudson River.—Louis Drago has been appointed Canadian Passenger Agent of the New York Central and West Shore railroads, with headquarters at Toronto, Ont. He succeeded J. McCarthy, promoted. Mr. Drago was heretofore Agent of N. Y. C. at Suspension Bridge, N. Y.

Northern Pacific.—H. M. Moran has been appointed Night Chief Train Dispatcher at Tacoma, Wash., succeeding E. Ringer, promoted.

Pacific Coast Co.—At the election of officers, held in New York, Nov. 4, the following officers were chosen: Chairman of the Board of Directors, Henry W. Gannon; President, J. B. Farrell; Secretary, H. H. Durand; Treasurer, John Kean. The Executive Committee consists of Henry W. Cannon, E. H. Harriman, Daniel S. Lamont, T. Jefferson Coolidge, Jr., and Grant B. Schley. Mr. Farrell was in 1894 General Superintendent of the Western Division of the Great Northern Railway. His headquarters will be at Seattle. He succeeds H. H. Durand as President.

Pennsylvania.—Charles B. Cramer has been appointed Foreman of the Engine Houses at Allegheny, Pa.

Pennsylvania Company.—Robert H. Harrison, Foreman of the Pittsburgh, Fort Wayne & Chicago shops, at Fort Wayne, Ind., has resigned. He has been an employee for 40 years, and retires on a pension.

Portland & Rochester.—Herbert W. Davis has been appointed Assistant Superintendent, with office at Portland, Me.

St. Louis & San Francisco.—Robert Aaron has been appointed foreman of the yards at Springfield, Mo., Mo., succeeding A. Scherrey. (Oct. 28, p. 785.)

J. H. Mace has been appointed Superintendent of the St. Louis terminals, with headquarters at St. Louis, Mo.

St. Louis, Kansas & Southwestern.—The office of Traffic Manager and Auditor has been separated. A. N. Brown continues to act as Traffic Manager, and Edward L. Kingsbury has been appointed Auditor, both having headquarters at Arkansas City, Kan.

St. Louis, Peoria & Northern.—At a meeting of the directors, held in St. Louis Nov. 3, John N. Faithorn was elected President of the reorganized company. Mr. Faithorn has been heretofore Vice-President and General Manager of the Street Western Stable Car Line. He succeeds Wm. E. Guy, who has resigned to become President of the company building the extension of the St. L., P. & N. line from Peoria to Chicago. Mr. Faithorn's headquarters will be at St. Louis, Mo. (See Railroad News and Construction columns.)

South Atlantic & Ohio.—A. B. B. Harris, heretofore Acting Superintendent, has been appointed General Superintendent, with headquarters at Bristol, Tenn. (July 15, p. 521.)

Southern.—L. L. McClesey, heretofore Commercial Agent at Atlanta, Ga., has been appointed Assistant General Freight Agent at Atlanta, succeeding Haiden Miller, resigned.

Southern Pacific.—D. P. Kellogg has been appointed Superintendent of the air equipment and coach trucks at Oakland, Cal.

Texas & Pacific.—A. D. Savage, Supervisor at El Paso, Tex., has resigned.

Trail & Salmon River.—The officers of this company, recently organized in British Columbia, are: Frank Fletcher, President; J. A. Gilker, Vice-President; W. A. Galliher, Secretary and Treasurer; Frank Moberly, Chief Engineer; all of Nelson, B. C.

Union Pacific.—W. S. Hobbs, heretofore Trainmaster of the Southern at Columbus, Miss., has been appointed Train Dispatcher at Laramie, Wyo. (Oct. 28, p. 785.)

E. R. Griffin has been appointed Assistant Superintendent of the bridge and first districts, in place of Henry Flaven, transferred. His office is at Omaha, Neb.

Washington County (B. & O.).—At the annual meeting held in Hagerstown, Md., A. Faure was elected Secretary and Treasurer, succeeding F. M. Hildebrandt, and W. H. Mathia was chosen a Director, succeeding W. F. Burns, resigned.

Wisconsin Central.—Wm. Percy has been appointed Master Car Builder, with headquarters at Stevens Point, Wis. He succeeds W. Cormack.

RAILROAD CONSTRUCTION,

New Incorporations, Surveys, Etc.

ALASKA ROADS.—The Anglo-Alaskan Syndicate, Ltd., of London, Eng., whose American offices are at Seattle, Wash., has completed arrangements for building the Norton Bay & Yukon RR., and is inviting tenders for rail and rolling stock of American builders. This line is to run from Norton Sound above Fort St. Michael, Alaska, east about 120 miles to the Yukon River, cutting off some 400 miles of difficult river navigation. (Sept. 16, p. 678.)

ALLEGHENY JUNCTION.—This company, recently incorporated in Pennsylvania, will build a steam railroad one mile long within the limits of Pittsburgh, to connect the Allegheny Valley with the Pittsburgh Junction, and so with the lines of the Baltimore & Ohio and the Pittsburgh & Western. Capital is secured for the building and most of the road is built and in operation. A. H. Keith is President and J. W. Patterson Chief Engineer, both of Pittsburgh.

ASTORIA & COLUMBIA RIVER.—Improvements are reported in contemplation at Astoria, Ore., including an extension of the line from New Astoria to the Government reservation at Fort Stevens. There is talk also of extending the road a mile further up the Necamicum River.

ATCHISON, TOPEKA & SANTA FE.—Surveys are completed for the recently incorporated Perris & Lake View line (Oct. 21, p. 769), of this company, to run from Perris, Cal., northeast via Lloyd to Lake View. The contract for grading is let to Grant Bros., Los Angeles, and grading was to be completed last week. The work is light, the maximum grade being 1.5%. and the maximum curve 4°. Track laying, bridging, etc., will be done by the company's own force. The officers of the company are the same as for the Southern California. (Official.)

ATLANTIC COAST LINE.—Bids have been asked grading and trestle work on the extension of the Manchester & Augusta from Denmark, S. C., northwest 34.7 miles via Barnwell to Robbins. It is to be completed before May 1, 1899.

BANGOR & PORTLAND.—The siding to the Nazareth Portland Cement Company's plant at Nazareth, Pa., one mile long, has been completed.

BISMARCK & POTOMAC VALLEY.—This company was incorporated in West Virginia Oct. 13, with a capital stock of $100,000, to build a line from a point on the West Virginia Central & Pittsburgh in Tucker County, east through Tucker, Grant, Hardy and Hampshire counties, to the Virginia state line. The incorporators are Samuel B. Shank, Christian R. Herr and Benjamin H. Snaveley of Lancaster County, Pa.; Powell Evans, Samuel Mason, Henry W. Stoakes and B. Gilpin Smith of Philadelphia. This is probably the same road for which Chief Engineer C. M. Bolton of Winchester, Va., is reported making surveys. The survey runs through Bismarck, Moorefield, Romney, Capon Bridge and High View, W. Va., to Winchester.

BUFFALO, ROCHESTER & PITTSBURGH.—In President Yates' annual report, it is stated that during the year 49.2 miles of main track was relaid with 80-lb. rails, making a total mileage of 225.8 miles equipped with heavy rail. The road at West Seneca, N. Y., was elevated to cross the Terminal Ry. of Buffalo. The viaduct over Cataraugus Creek on the Buffalo Division, costing $104,384, was completed. In building the viaduct the alignment was straightened.

CANADIAN PACIFIC.—F. Tye, Chief Engineer of the Columbia & Western, sends some particulars as to the building of the extension from Robinson, B. C., west 105 miles to Midway. This is a very difficult and expensive work, costing $40,000 per mile. There are seven tunnels, nearly all requiring rock borings, which aggregate 5,300 ft. in length, the estimated cutting being 66,000 cu. yds., or about 200,000 tons of rock. This does not include the rock cutting in the open cuts and on the mountain sides. The estimates for this work between the new town of Brooklyn and Robson alone are quoted 1,750 cu. yds. of rock to be blasted away. The first tunnel, which is between Brooklyn and Robson, is 200 ft. long. The second, at Shield's Landing, eight miles below Brooklyn, is 300 ft. long, of which one-third is finished. The third is four miles west of Brooklyn, and is 3,000 ft. long. Work here is just begun, and it is estimated that about 12 months will be required for its completion. It is being bored by air drills supplied by the Rand Drill Co. of Eastern Canada. The other tunnels are being bored with hand drills. McLean Brothers have the contract for this tunnel. The fifth tunnel is 23 miles from Brooklyn, or 36 miles from Robson. It is 700 ft. long, and is under contract to Alaf Olsen. From this point no more tunneling is required until near Greenwood, where the work is again heavy. At that point there are two tunnels, each between 300 ft. and 400 ft. long. The plans require that each of the above tunnels shall be 16 ft. wide and 21 ft. high. This branch will cost $4,000,000, and is about the most difficult piece of work ever undertaken for that distance, and the most expensive in Canada. There are over 3,000 men employed. (Sept. 23, p. 696.)

Mr. James, Division Superintendent, informs us that rails are being laid on the Stonewall extension in Manitoba at the rate of one and one-half miles a day, and that this branch will be extended about 20 miles by the time that the ground gets too hard for work. Track laying will be finished in 10 days. The track layers will then be transferred to Reston, Manitoba, where they will begin laying rails on the Pipestone extension west. The company hopes to have 25 miles laid upon that new grade during the present season. (Aug. 19, p. 603; Oct. 28, p. 786.)

Sir William Van Horne, President, stated in a recent interview on his trip of inspection over the C. P. R. R., in British Columbia, that the company proposes to give New Westminster better railroad facilities, and that the line would be extended to Vancouver from the junction, via the north arm of the Fraser River. Confirmation of this statement was made at the main office, with the announcement that the extension would be built in the spring.

CEDAR RAPIDS, GARNER & NORTHWESTERN.—This company has been reincorporated in Iowa, with a capital stock of $250,000, to build the line now under construction through Hayfield Junction, the present terminus of the Burlington, Cedar Rapids & Northern in Hancock County, northwest 20 miles into Cossuth County. A. C. Ripley is President and Henry S. Brush Secretary.

CENTRAL OF GEORGIA.—Surveys are reported in progress for an extension from Columbia, Ala., west about 18 miles to Dothan. It is stated that the surveys are to be extended either to Geneva or to a point near Searight on another division.

CHICAGO, ROCK ISLAND & PACIFIC.—The wooden trestles on the line between Philipsburg, Kan., and Colorado Springs, Col., are reported being replaced with steel girders. There are about 20 of these trestles, and the replacement is being carried on under the supervision of W. E. Dauchy, Engineer of Maintenance and Construction.

CINCINNATI, PORTSMOUTH & VIRGINIA.—Preliminary surveys are being made, according to report, for an extension of this road from the main line along the west side of the Scioto River, near Portsmouth, O., to the Carey's Run stone district.

CLEAR WATER VALLEY.—This company has been incorporated in Oregon, with a capital stock of $3,000,000, to build and operate several hundred miles of railroad and telegraph lines in Oregon, Washington and Idaho. The incorporators are W. H. Kennedy, Chief Engineer of the Oregon RR. & Navigation Co.; C. W. Mulks, J. C. Haveley and Chas. Steel. It is understood that the proposed line is to run up Snake River in Washington to Lewiston, Idaho, and thence up the Clear Water Valley, with several branches.

COLUMBUS, LIMA & MILWAUKEE.—A. Brown of Ottawa, O., has the contract for ties, surfacing the grade, track laying and ballasting from Lima, O., north 40 miles via Gomer, Kelida, Dorninton and Continental to Defiance. The Johnson Steel Co. of Lorraine, O., has the contract for rails. J. G. W. Cowles of Cleveland, O., is President, and C. T. Hobart, Defiance, Chief Engineer. (Nov. 4, p. 804.)

DALLASTOWN.—The route of this company, whose incorporation was noted in this column Oct. 28 (p. 786), is from a point near Red Lion, Pa., on the York Southern, southwest to Dallastown. The work is not difficult. The maximum grade is 2%, and the maximum curve 2°. No bridges will be needed. Prospects for building are good, but it has not been determined yet when contracts for grading etc., will be let. The company will require 140 tons of 60-lb. rails, but will need no rolling stock. The officers are given under Elections and Appointments. (Official.)

DAVENPORT, ROCK ISLAND & WESTERN.—John Lambert, President of the American Steel & Wire Co., Moline, Ill., is reported as stating that this company, which is the successor to the Davenport, Rock Island Bridge & Terminal Co., will build a belt line around Moline, Rock Island and Davenport, tapping all the roads running into those cities. The company will complete the bridge and terminals over the Mississippi at Davenport and may extend the road to Peoria. (Sept. 23, p. 696.)

DELAWARE & HUDSON CANAL.—Judge Chester, in the Supreme Court at Albany, N. Y., has decided on appeal in favor of the state against the proposed extension of the Adirondack Company's line across state lands from North Creek, N. Y., northwest about 50 miles to Tupper Lake. This extension has been under consideration for some years, and was to connect the New York & Ottawa with the D. & H. (March 18, p. 208.)

EASTERN RAILWAY OF MINNESOTA.—The widening and bringing to grade of embankments from West Superior to Sandstone, 60 miles, according to the annual report, is completed. Relaying the track between West Superior and Nickerson is in progress.

GALESBURG & GREAT EASTERN.—This company, which was recently incorporated as successor to the Galesburg, Etherly & Eastern, whose road ran from Galesburg, Ill., east 10 miles to Etherly, has completed an extension east into Victoria. Surveys are reported in progress for an extension east to Wyoming and thence to Lacon in Marshall County. Henry C. Harms of Etherly is President. (Sept. 16, p. 680.)

GALVESTON, LA PORTE & HOUSTON.—L. J. Smith, Railroad Inspector at 313 and 314 American Bank Building, Kansas City, Mo., writes that this road, the sale of which was confirmed to him on Oct. 27, is to be extended north, but that the objective point is not fully decided upon.

GREAT EASTERN.—Surveys are completed between Goldsboro and Pampego for this line, recently incorporated in North Carolina, to run from Selma, N. C., west 130 miles through Wayne, Green, Pitt, Beaufort and Hyde counties to Douglas Bay on Pamlico Sound. The estimated cost of building is $2,700,000. and the project includes the operating of steamers between Douglas Bay and New York, Philadelphia and Baltimore. The officers are given under Elections and Appointments. (Oct. 21, p. 768.)

GREAT NORTHERN.—In the annual report it is stated that the line between Carlisle and Elizabeth, Minn., 3.5 miles, was abandoned, and the tracks and structures removed. A new freight yard is building at St. Anthony Park, between St. Paul and Minneapolis, that will give 12 miles of additional track room, being space for about 1,500 cars. This will permit the business of St. Paul, Minneapolis and the Minnesota Transfer to be centralized, from which it can be conveniently handled to the points named. The yard covers about 24 acres. In building it, a mile and a quarter of four-track main line had to be rebuilt. During the year 19.55 miles of side track were built to industries along the line. About 123 miles of 75-lb. rail were laid. The rail removed, being of the 60 and 56-lb. class, was used in replacing rails on the branch lines and in the building of passing, yard and industry tracks.

HAWKINSVILLE, FITZGERALD & GULF.—Application has been made for the incorporation of this road, whose organization was recently noted (Oct. 28, p. 786), to run from Hawkinsville, Ga., south via Fitzgerald to a point in Florida on the Gulf of Mexico. H. V. Bowen of Lulaville, Ga., and P. H. Fitzgerald are among those interested.

HOLLY RIVER & ADDISON.—The line is from Palmer Junction on the West Virginia & Pittsburgh, up the banks of the Holly River to forks, thence up the right fork of the Holly River to Jumbo, 22 miles. The survey to this point is practically completed, and grading will be done as rapidly as possible. About 10 to 12 miles of the grading is completed, and about three miles of track laid. From 50 to 75 men are at work under the supervision of the company. The maximum grade is 3 per cent., and the minimum curve 28 degrees. The rails and rolling stock have been contracted for, except for a portion of the rails. (Nov. 4, p. 804.) George A. Hechmer, of Palmer, W. Va., is General Manager, and T. G. Baylor, Chief Engineer. (Official.)

KANSAS CITY, PITTSBURGH & GULF.—Surveys are completed and grading begun for the Northern Railroad from Trimble, Mo., north 10¼ miles to Gower. This forms the cut-off for the St. Joseph & Grand Island. (Oct. 27, p. 732.) Creech & Lee of Kansas City, Mo., have the contract. The work is medium. The maximum grade is 1¼%, and the maximum curve 4°. There will be one 100 ft. span bridge, and one 30 ft. span bridge, both of steel. (Official.)

LEADVILLE MINERAL BELT.—This company was incorporated in Colorado Oct. 29, with a capital stock of $100,000, to build an extension from the main line of the Denver, Leadville & Gunnison southwest to California Gulch, and thence via Oro City to Leadville. Among the incorporators are Frank Trumbull, A. D. Parker and H. W. Cowan, all of Denver, Col., and officials of the Denver, Leadville & Gunnison.

MISCELLANEOUS COMPANIES.—The Manzanita Copper Co. has been incorporated in Arizona with a capital stock of $20,000, to carry on a general mining business and to build railroads, canals, etc. The incorporators are: J. I. Crowell, F. Carter, B. F. Mansfield, A. L. Crowell and T. A. Warren. The principal office is Tucson, Ariz., with a branch at Los Angeles, Cal.

MOBILE & WEST ALABAMA.—The route of this proposed road is from Mobile, Ala., north via Tuscaloosa 200 miles, to Florence, 150 miles more, in all 350 miles. In 1891, under a state law, a survey was made by the state for this road at a cost of $9,000. The company is securing rights of way and prospects for building are improving. H. A. Austill, of Mobile, Ala., is President, and J. A. Milner, of Birmingham, Chief Engineer. (Official.)

NEW ROADS.—The Pioneer Mining & Manufacturing Co. of Birmingham, Ala., is reported to have let a contract to Dunn & Lallade, of Birmingham, for grading a road 4½ miles long from their iron furnaces at Thomas, near Birmingham, to their newly-acquired coal lands.

NEW YORK, SUSQUEHANNA & WESTERN.—During the year 6.2 miles of 71-lb. rail was laid on the main line, and a quarter of a mile of 80-lb. rail on the main line bridges. There was one mile of new side track built and 4.85 miles of old sidings extended.

NORTHERN PACIFIC.—The Spokane & Northern line of this company has filed papers at Waterville, Wash., asking for right of way from Lake Chetlan southeast 10 miles to the Columbia River.

OMAHA BRIDGE & TERMINAL.—Connection is made with the tracks of the Kansas City, Pittsburgh & Gulf in Council Bluffs, Ia. The company is building a railroad drawbridge across the Mississippi, with approaches at Omaha and Council Bluffs. (Oct. 21, p. 769.)

PANAMA.—The Colombian Government has given this company permission to establish terminal facilities at La Boca upon the payment of $400,000 and the granting of a loan to the state of $1,000,000.

PECOS VALLEY & NORTHEASTERN.—Approaches are reported finished for the crossing at Spring River, near Roswell, N. Mex., and grading is completed from Amarillo, Tex., to Texico, at the state line, 95 miles. The line when completed is to run from Amarillo southwest 206 miles to Roswell. (Oct. 28, p. 786.)

PENNSYLVANIA.—Five more tracks are to be built, according to report, at the Harrisburg, Pa., yards, making a width of 26 tracks. The company bought 20 acres of land some days ago for the proposed improvement.

The laying of a new stretch of track at the Black Log Curve above Mifflin, Pa., is begun.

Engineers of this company are reported making a preliminary survey for a branch from Upper Reese, Pa., to the farms of Adie Moore and Blair Isenburg, about three miles.

PITTSBURGH & WESTERN.—It is reported that contracts for building nine miles of new track near Harmony, Pa., were awarded. This is a part of the building of the double track between Pittsburgh and New Castle. The new track will be completed about February, 1899.

RIO GRANDE, SIERRA MADRE & PACIFIC.—Chief Engineer J. Fewson Smith of Cuidad Jurarez, Mexico, is reported as announcing that this company has decided to build an 80-mile narrow gage extension from its present terminus at Casas Grandes, west to traverse the mineral regions of the Yaqui gold country. This line, which runs from Cuidad Jurarez southwest 157 miles to Casas Grandes, was completed last year. (March 4, p. 170.)

RUTLAND & CANADIAN.—The bill to incorporate this road, referred to last week (p. 804), has passed the Vermont Legislature.

ST. LAWRENCE RIVER & ADIRONDACK.—This company has been incorporated in New York to build a line from the St. Lawrence River south over 100 miles along the Racket River, to North Creek.

ST. LOUIS, IOWA & DAKOTA.—Chief Engineer L. F. Wakefield is making surveys for this line, formerly the Sioux City, Chicago & Baltimore, to run from Sioux City, Ia., southeast 512 miles to St. Louis. T. P. Gere of Sioux City, Ia., is President.

ST LOUIS, IOWA & NORTHERN.—Preliminary surveys have been made from Eldon, Ia., south through Davis and Van Beuren counties, Ia., and Scotland, Knox, Shelby, Monroe, Andrian, Callaway and Montgomery counties, Mo., connecting with the Missouri, Kansas & Texas at or near Rhineland, on

the north side of the Missouri River. The locating survey through Shelby County, Mo., has just been finished, at which point grading will be begun. The company expects to have the entire line of 174 miles in operation by July 4, 1899. Bids will be asked within 60 days. The maximum grade is 1%, and the longest bridge 120 ft. Principal offices are at Eldon, Ia., where conection will be made with the Chicago, Rock Island & Pacific. (Oct. 28, p. 787.) The road was formerly known as the Eldon & St. Louis. S. H. Sawyers is President, and J. E. Houghland General Superintendent, both of Eldon, Ia. (Official.)

ST. LOUIS, PEORIA & NORTHERN.—The Laclede Construction Co. of St. Louis has taken the contract for the extension of this line from Peoria, Ill., to Chicago. The name of the road has been changed to the St. Louis & Northern Short Line. (See Railroad News column.)

SAN FRANCISCO & SAN JOAQUIN VALLEY.—Officers of the Atchison, Topeka & Santa Fe have been in San Francisco investigating the proposed terminal facilities for this road, which they have just acquired. The Valley road holds the lease of a considerable acreage of ground fronting on China Basin, but it is not certain that this will be used for the terminals. A fast ferry boat will meet any incoming trains at Point Richmond, conveying passengers to Union Ferry Depot, San Francisco, at the foot of Market St.

SANTA FE, PRESCOTT & PHOENIX.—President F. M. Murphy in his annual report states that the main line ought to be extended to Tempe and Mesa, Ariz. The line now runs from Ashforth south to Phoenix, 197.6 miles.

SHREVEPORT & RED RIVER VALLEY.—Representatives of this company are reported prospecting in the vicinity of Alexandria, La., for the purpose of extending this line from Coushatta southeast to that city. The road was completed from Shreveport to Coushatta in the first half of this year. (June 24, p. 467.)

TRAIL & SALMON RIVER.—Under this title a company has been organized to build the road for which application is to be made in the Legislative Assembly of British Columbia next season. (Canadian Roads, Sept. 16, p. 678.) The line is to run from Trail east via Sayward to Salmon, and thence south down Salmon River to its junction with the Pend d'Orelile River. Notice of this application was made recently by Galliher & Wilson of Nelson, B. C. It is stated that the Canadian Pacific is interested in this line, and has given entire approval to the plan. The officers are given under Elections and Appointments.

UNION, CORNUCOPIA & EASTERN.—Joseph Johnston, of Portland, Ore., Superintendent of Construction of the Oregon Equipment Co., and promoter of this road, has contracted for 1,000 Chinese graders to push the work. He left for Union the first of the month with 50 men, and was to be joined by 50 more at La Grand and Baker City. The line is to run from Union, Ore., southeast through Pine Valley to Ballard's Landing on Snake River, and thence to Bear, Idaho. The main office is Union, Ore. The company has close connection with the Union, Cove & Valley, which is building from Union north 12 miles to Cove. (Sept. 30, p. 715.)

UNION PACIFIC.—Surveys which were in progress for an improved location between Cheyenne and Laramie are completed. The new line does not reduce the distance materially, but it reduces the heavy grades. The newly located line begins at a point three miles south of Dale Creek bridge, running four miles south of Sherman. It parallels the old line, but reduces the grade from a 100-ft. to a 60-ft. grade. It also does away with the Dale Creek bridge and Sherman summit. (Sept. 16, p. 679.)

WHITE PASS & YUKON.—Work is nearly completed to the summit of White Pass, about 20 miles, this being the most difficult portion of the 312 miles from Skaguay, Alaska, to Fort Selkirk. Grading is also under way in British Columbia between the summit and Lake Bennett. Work will be carried on during the entire winter unless prevented by heavy storms. The maximum grade is 3.9%, and the maximum curve 16°. The roadbed is largely on the steep mountain side, from 400 to 1,000 ft. above the bed of the Skaguay River. After reaching the summit the line traverses the eastern shore of Summit Lake, crosses the portage between Summit and Middle Lakes, then passes along the western shore of Middle and Shallow Lakes, crossing the Divide at Log Cabin Police Station, and thence to Lake Bennett, 41 miles from Skaguay. It follows along the east shore of Lake Bennett to Cariboo Crossing, thence by Watson River to the crossing of the Tahkanee River, and thence through a gently rolling country to Fort Selkirk. The new gold find of the Atlin Lake District is most accessible from this line, being about 35 miles by a good trail now building, and is also accessible by steamers at the head of Lake Bennett. (Oct. 7, p. 732.) E. C. Hawkins of Skaguay is Chief Engineer and Superintendent. (Official.)

WISCASSET & QUEBEC.—Rails are laid for the entire distance from Albion, Me., north 11 miles to Burnham, but on account of the opposition to the crossing of the tracks of the Maine Central, trains are not running. The question of crossing the tracks is under consideration by the State Commission. (Jan. 21, p. 51.)

WYOMING & MISSOURI RIVER.—Grading is reported completed to within three miles of the Hay Creek coal fields on this line from Belle Fourche, N. D., up the Hay Creek Valley 18 miles to Barrett, Wyo., and rails are laid over three-fourths of the distance. Geo. M. Nix of Belle Fourche, N. D., is President. (Oct. 14, p. 751.)

Electric Railroad Construction.

ALBANY, IND.—The Albany, Dunkirk & Camden Traction Co. is reported incorporated with a capital stock of $25,000. The incorporators are H. Clay Billingsley, John E. Billingsley, W. F. Machlan and G. L. Sullivan. Another set of projectors has filed articles for the incorporation of a company to build between these same towns. (See Camden.)

CAMDEN, IND.—The Camden, Dunkirk & Albany Traction Co. is reported incorporated, with a capital stock of $150,000. The incorporators are G. W. and J. A. Simpson of Chicago, and Geo. W. Whittaker of Dunkirk.

CLEVELAND, O.—The Pennsylvania & Ohio Electric RR. has begun tracklaying at Ashtabula, on its road between Painesville and the Pennsylvania state line. Thomas Fricker, Ashtabula, O., is President. (Apr. 22, July 1, pp. 301, 485.)

DAYTON, O.—O. W. Lieman, C. E., in charge of the construction work on the Dayton, Wilmington & Spring Valley Electric Railroad, who is stopping at the Cooper House, stated that work on the road is progressing rapidly and that a franchise would be asked for soon from the city of Dayton. (Dec. 10, 1897, p. 879.)

DECATUR, ILL.—The City Electric Ry. will extend the trolley on Fairlawn Park and West Eldorado St., two driving avenues of considerable length.

FORT SMITH, ARK.—The Fort Smith Traction, Light & Power Co. was recently incorporated. The incorporators are Richard C. Kearns and Charles H. Smith of St. Louis, Samuel McLoud and Alfred N. Sicard.

GLENS FALLS, N. Y.—The Glens Falls, Sandy Hill & Ft. Edward St. RR. Co., it is stated, will equip a mill on the canal between Glens Falls and Sandy Hill as a reserve power station.

KINGSTON, N Y.—The Colonial City Traction Co. has notified the State Railroad Commissioners that it intends building an extension.

NEWPORT NEWS, VA.—An ordinance was recently introduced in the City Council to give a franchise to the Peninsula Ry. Co. This company was incorporated at the last session of the Virginia Legislature, and among the incorporators are W. A. Post, W. E. Cottrell, John G. Livezey, A. L. Parker and L. P. Stearnes.

OREGON CITY, ORE.—The Oregon City Council passed an ordinance giving W. H. Burghardt authority to build an electric railroad. (Sept. 23, p. 697.)

QUEBEC, QUE.—The Quebec, Montmorency & Charlevoix Ry. Co. proposes to electrify the road to Cape Tourmente, and to build a branch to Montmorency Falls. The estimated cost of improvements is $330,000. (Sept. 30, p. 715.)

ST. LOUIS, MO.—The Clifton Heights & Oakland Ry. Co., recently organized, has made application for a franchise to build a street railroad in St. Louis.

SPOKANE, WASH.—An ordinance was passed recently granting a franchise to the Spokane St. Ry. Co. to lay tracks on several streets.

UTICA, N. Y.—The Utica Suburban Ry. Co., a leased road of the Utica Belt Line St. RR., has applied for franchises to extend its line from Oriskany to Rome.

VICTORIA, B. C.—Messrs. W. Jensen and L. Goodacre of Victoria, have applied to the British Columbia Legislature for a charter for the Hardy Bay Tramway Co., to build an electric street railroad.

WASHINGTON, D. C.—The Washington & University RR. Co., which was incorporated at the last session of Congress, is authorized by the Commissioners of the District of Columbia to issue $175,000 of stock for purposes of construction. The road is to be a double track, and will be operated by electricity. The company must sell six tickets for a quarter. J. D. Croissant is Engineer.

WAUKEGAN, ILL.—Mr. A. C. Frost, Vice President of the Chicago & Milwaukee Electric Ry. Co., has made the following announcement in regard to the plans of the company:

Our road will run between Waukegan, Ill., and Chicago, a distance of 30 miles. It is in operation between Waukegan and the southern limits of Highland Park, Lake County, about 16 miles. Work is now being done on the extension south, but we do not expect to have the road completed to Evanston until the early part of next summer. We then shall have on the north shore of Lake Michigan a straight line 30 miles long connecting 15 cities and towns. A large portion of our road is being built on private right of way, and we have not a single steam or electric railroad crossing our entire line.

From Waukegan to North Chicago we run west of the Milwaukee branch of the Chicago & Northwestern, at which point we run under their tracks by means of a subway, and from there south we run east of the Northwestern tracks to Evanston. Our average grade is about 1 per cent., and the highest grade on the entire line is less than 2 per cent., being one of the approaches to the subway.

Of the $1,000,000 of bonds authorized $400,000 are delivered by the trustee upon the company's power plant and the 16 miles of road built and in operation, the balance to be delivered at the rate of 75 per cent. of the actual cost of betterments and extensions. The cost of the road between Waukegan and Highland Park and the franchises which we purchased from the Bluff City Electric Street Railway Company is about $510,000. While the road between Waukegan and Highland Park has been under construction all this summer, the gross earnings for the three months ending Oct. 1 amounted to $12,025, and the operating expenses $7,672, leaving net earnings of $4,535. The officers of the company are: President, G. A. Ball; Vice-President, A. C. Frost; Treasurer, J. W. Mauck; Secretary, G. M. Seward. (Jan. 28, May 6, May 20, pp. 71, 333, 367.)

WEYMOUTH, MASS.—A hearing was had before the Selectmen of Weymouth recently on the petition of the Quincy & Boston St. Ry. for a location on certain streets. The petition was opposed by the Braintree & Weymouth St. Ry. Co., which signified its intention of making any extensions in Weymouth deemed necessary by the townspeople.

GENERAL RAILROAD NEWS.

Railroad Earnings.

Showing the gross and net receipts for the periods ending at the dates named:

Sept. 30.			1898.	1897.	Inc. or Dec.	
Boston & Albany.						
3	months	Gross	$2,370,089	$2,522,403	D.	$152,314
3	"	Net	873,857	620,744	I.	253,113
Buffalo, Rochester & Pittsburgh.						
3	months	Gross	$1,024,846	$931,500	I.	$93,346
3	"	Net	366,022	330,644	I.	35,378
Chicago, Rock Island & Pacific.						
1	month	Gross	$2,030,844	$1,966,463	I.	$64,381
1	"	Net	832,050	861,311	D.	29,261
6	months	Gross	10,556,771	9,416,247	I.	1,140,524
6	"	Net	3,788,329	3,451,644	I.	337,185
Cleveland, Cincinnati, Chicago & St. Louis.						
1	month	Gross	$1,400,326	$1,239,096	I.	$161,230
1	"	Net	457,118	291,169	I.	165,949
3	months	Gross	3,856,029	3,588,762	I.	267,267
3	"	Net	1,126,444	841,205	I.	285,239
Delaware, Lackawanna & Western.						
3	months	Gross	$2,824,675	$2,372,003	I.	$452,672
3	"	Net	1,739,373	1,296,302	I.	443,071
Fitchburg.						
3	months	Gross	$1,936,139	$2,000,461	D.	$64,322
3	"	Net	724,871	746,130	D.	21,259
Kansas City, Fort Scott & Memphis.						
1	month	Gross	$402,090	$467,003	D.	$64,912
1	"	Net	133,328	166,151	D.	32,823
3	months	Gross	1,154,408	1,275,347	D.	120,939
3	"	Net	370,469	418,577	D.	48,107
Long Island.						
1	month	Gross	$579,278	$463,177	I.	$116,101
1	"	Net	213,881	172,574	I.	41,307
3	months	Gross	1,726,684	1,535,380	I.	191,304
3	"	Net	748,819	685,585	I.	63,234
Long Island System.						
1	month	Gross	$633,661	$506,722	I.	$126,939
1	"	Net	240,353	190,469	I.	49,884
3	months	Gross	1,955,666	1,749,311	I.	206,355
3	"	Net	868,717	807,407	I.	61,310
Mexican International.*						
1	month	Gross	$271,381	$242,189	I.	$29,192
1	"	Net	117,292	82,011	I.	35,281
9	months	Gross	2,486,855	2,259,748	I.	227,107
9	"	Net	986,158	842,758	I.	143,400
*Mexican currency.						
Mexican National.*						
1	month	Gross	$506,100	$476,959	I.	$33,141
1	"	Net	248,742	222,301	I.	26,441
9	months	Gross	4,551,326	4,461,646	I.	89,680
9	"	Net	2,081,082	2,166,585	D.	85,503
*Mexican currency.						
New York, Susquehanna & Western.						
1	month	Gross	$200,390	$201,255	I.	$865
1	"	Net	88,140	105,239	I.	17,099
Oregon Railroad & Navigation Co.						
1	month	Gross	$698,918	$702,320	D.	$3,402
1	"	Net	347,167	386,033	D.	38,866
3	months	Gross	1,808,757	1,701,526	I.	107,231
3	"	Net	793,617	844,045	D.	50,428
Oregon Short Line.						
1	month	Gross	$654,698	$534,589	I.	$120,108
1	"	Net	311,501	197,680	I.	113,821
3	months	Gross	1,806,194	1,595,346	I.	210,847
3	"	Net	852,838	627,841	I.	224,997
Rio Grande Western.						
1	month	Gross	$301,580	$301,571	I.	$9
1	"	Net	106,773	115,072	D.	8,299
3	months	Gross	846,350	893,306	D.	46,956
3	"	Net	279,737	356,172	D.	76,435
San Antonio & Aransas Pass.						
1	month	Gross	$303,698	$232,436	I.	$71,262
1	"	Net	178,997	103,943	I.	75,054
3	months	Gross	597,826	576,067	I.	21,759
3	"	Net	239,054	201,220	I.	37,834
Southern Pacific.						
1	month	Gross	$5,229,536	$4,918,970	I.	$310,566
1	"	Net	2,271,272	2,202,458	I.	68,814
3	months	Gross	14,541,499	14,330,368	I.	211,131
3	"	Net	5,688,629	6,123,738	D.	435,108
Union Pacific, Denver & Gulf.						
1	month	Gross	$330,777	$323,482	I.	$7,295
1	"	Net	129,798	112,971	I.	16,826
9	months	Gross	2,717,735	2,456,953	I.	260,781
9	"	Net	846,865	575,944	I.	270,920
Western New York & Pennsylvania.						
1	month	Gross	$288,219	$325,780	D.	$37,561
1	"	Net	51,718	142,000	D.	90,282
3	months	Gross	846,897	918,480	D.	71,583
3	"	Net	242,038	383,743	D.	141,705

Oct. 31.			1898.	1897.	Inc. or Dec.	
Buffalo, Rochester & Pittsburgh.						
1	month	Gross	$350,679	$353,701	D.	$3,022
Chicago, Great Western & St. Paul.						
1	month	Gross	$533,007	$526,709	I.	$6,297
4	months	Gross	2,002,219	1,922,055	I.	80,164
Great Northern System.*						
1	month	Gross	$3,106,248	$2,719,307	I.	$386,941
4	months	Gross	9,617,613	8,769,468	I.	853,145
*Estimated.						
Southern.						
1	month	Gross	$2,253,226	$2,069,871	I.	$183,355
4	months	Gross	8,422,345	7,370,267	I.	1,052,078
Texas & Pacific.						
1	month	Gross	$888,175	$908,963	D.	$70,788
10	months	Gross	6,092,694	5,697,038	I.	395,656

ATCHISON, TOPEKA & SANTA FE.—The company has issued $3,118,000 additional general mortgage 4% bonds to redeem the outstanding guaranty fund notes due Nov. 1. This makes the total outstanding of these bonds $124,074,000. (July 22, p. 539.)

ATLANTIC COAST LINE.—At a meeting of the stockholders of the A. C. L. Co. of Connecticut, held at Bridgeport, it was decided to increase the capital stock from $5,000,000 to $10,000,000. The additional stock will be distributed Nov. 12 among the stockholders as a stock dividend, and represents the accumulated profits and increased valuation of the assets. This company is the proprietary company of the A. C. L. system of railroads in Virginia and North and South Carolina.

Holders of $2,500,000 out of a total issue of $2,895,000 underlying 4% and 5% bonds of the A. C. L. of South Carolina, have accepted the offer to exchange for new general first mortgage 4% bonds and common stock. This company on Aug. 1 became the successor to the Wilmington, Columbus & Augusta, the Northeastern of South Carolina, the Cheraw & Darlington, the Manchester & Augusta and the Florence of South Carolina. The right to make exchange for new bonds and stock expired Nov. 1. (Aug. 5, p. 588.)

BALTIMORE & ANNAPOLIS SHORT LINE.—At the meeting held in Baltimore, Md., Nov. 3, the stockholders voted to authorize the issue of $400,000 of 5% 25-year mortgage bonds, to pay the floating debt and for future uses. The Mercantile Trust & Deposit Co. of Baltimore is reported to have taken $325,000 of the issue. (Oct. 28, p. 787.)

BALTIMORE & OHIO.—Holders of the various securities of the Central Ohio, the Sandusky, Mansfield & Newark, the Columbus & Cincinnati Midland, the Newark, Somerset & Straitsville, the Pittsburgh Junction and the Pittsburgh Junction Terminal, are notified that the date for depositing their securities is extended from Nov. 1 to Nov. 21. (Oct. 21, p. 770.)

BROOKLYN ELEVATED.—The properties of this company, including the Union Elevated (absorbed) and the Seaside & Brooklyn Bridge Elevated (a leased line), were advertised to be sold under fore-

closure at 189 Montague St., Brooklyn, Nov. 10. (Sept. 30, p. 716.)

CHICAGO, FORT MADISON & DES MOINES.—Judge Woolson, in the United States Court at Keokuk, Ia., Nov. 4, signed a decree of foreclosure against this road, the sale to take place about Jan. 1. Washington I. Babb of Mt. Pleasant was made special Master to conduct the sale. The line runs from Fort Madison, Ia., to Ottumwa, 71 miles. It has a capital stock of $1,970,200, and its funded debt is $1,313,000. General Manager E. F. Potter was appointed Receiver July 28. (Aug. 5, p. 572.)

COLUMBUS & CINCINNATI MIDLAND.—The first mortgage 4½% bonds, held in Baltimore under the control of the Daly-Middendorf Committee, have been deposited with Guarantee Trust & Safe Deposit Co. of Philadelphia, under the plan of the bondholders' committee, of which Charles S. Hinchman is chairman. This committee now has a large majority of the bonds under its control. The line runs from Columbus, O., to Midland City, 69.8 miles, and was leased in January, 1890, to the Central Ohio. The lease was afterward assigned to the Baltimore & Ohio, which owns the common stock. (May 13, p. 350.)

COLUMBUS, HOCKING VALLEY & TOLEDO.—Twelve car trust bonds of 1894, series A, have been drawn for redemption at par and accrued interest, on Jan. 1, 1899, at the Atlantic Trust Co., New York.

GREAT NORTHERN.—This company offers to buy the outstanding shares of the St. Paul, Minneapolis & Manitoba at 125, payable in stock at par. The stock to be issued for this purpose will be of the same class as that now outstanding. Deliveries of the old stock must be made between Jan. 1 and 15, 1899.

HOUSTON BELT & MAGNOLIA PARK.—The property of this company was again sold under foreclosure Nov. 2, at Houston, Tex., to H. E. Fuller, representative of local purchasers, for $9,100. The sale made May 3 to J. E. Ashan for $5,000 was not confirmed, and Master Commissioner Frank Andrews was ordered to sell the property at the upset price of $7,500. It is stated that Mr. Fuller proposes to change the property to an electric road. (May 13, p. 350.)

MEXICAN NOR. ERN.—Holders of first mortgage bonds are notified that offers will be received to buy these bonds to an amount sufficient to exhaust $24,442, at the lowest price offered, not to exceed 105 and accrued interest, at the office of the State Trust Co., New York.

MIDDLETOWN, MERIDEN & WATERBURY.—This company has been incorporated in Connecticut with a capital stock of $100,000, as successor to the Meriden, Waterbury & Connecticut River, which runs from Cromwell, Conn., west 29.5 miles to Waterbury, with a branch of 0.84 mile in Meriden. The road was leased to the New York & New England for 99 years from Sept. 1, 1892, at an annual rental of $22,500, which was paid only to Jan. 1, 1894. The reorganization committee of the N. Y. & N. E. bought all the mortgage bonds and 3,807 shares of the stock and delivered them to the New England. Foreclosure sale of the mortgage on the property was made on May 18, 1896, and on May 30 following the New England turned the property over to the purchaser, A. Heaton Robertson, New Haven, Conn., and it has not been operated since. The incorporators of the new company are: A. Heaton Robertson and John B. Robertson, New Haven; Frederic C. Wagner and Henry C. Ely, New York; John L. Villard, Chas. L. Rockwell and H. L. B. Pond, Meriden; Wm. H. Clark, Brooklyn, N. Y.; Frederick H. Kingsbury, Waterbury, Conn. It is stated that the road is to be put into operation by Dec. 1.

PEORIA, DECATUR & EVANSVILLE.—In the United States Circuit Court at Springfield, O., Nov. 8, Judge Allen entered a decree of foreclosure and sale in the case of the New England Trust Co. against the Chicago & Ohio River, on the mortgage for $300,000, executed in May, 1886, on which interest was defaulted. The C. & O. Co. owning the line from Sidell, Ill., to West Liberty, 76.89 miles, was absorbed by the P., D. & E. in August, 1893. The parent company went into the hands of receivers Jan. 10, 1894.

ST. LOUIS, PEORIA & NORTHERN.—The contract between this company and the Chicago Terminal Transfer, granting terminal facilities at Chicago (Nov. 4, p. 806), runs for 99 years at a fixed rental from July 1, 1910, of $150,000 per annum, in addition to taxes and maintenance. In commutation of the fixed rental to accrue for the use of these terminal facilities, prior to July 1, 1910, the Terminal Co. is to receive in installments, averaging approximately 10% monthly, the sum of $880,000 in cash, which is to be deposited with the Guarantee Trust Co. of New York for investment, upon the agreement that the interest accruing on this fund shall be paid to the Terminal Co. as received, and the principal delivered to the Terminal Co. in equal annual installments, beginning Jan. 1, 1901. Twenty per cent. in cash ($176,000) has been received and invested in the 4% bonds of the Terminal Co.

SEABOARD AIR LINE.—Walter H. Neal has filed at Wilmington, N. C., a consolidated mortgage for $3,000,000 from the Carolina Central, representing the entire indebtedness of that company. This is under the agreement recently adopted. (Oct. 28, p. 788.)

SOUTHERN PACIFIC.—Speyer & Co., New York, have bought $10,000,000 of the S. P. of California consolidated first mortgage 5% gold bonds, due 1937, principal and interest unconditionally guaranteed by the S. P. Co. These bonds are a part of about $20,000,000 exchanged during the past few years for underlying bonds and for new building. The new bonds will probably be offered soon for public subscription in this country, in London and on the Continent. The S. P. of California, not long ago, absorbed a number of subordinate lines in California. (Apr. 2, p. 302.)

TOLEDO, ST. LOUIS & KANSAS CITY.—Receiver R. B. F. Pierce has taken up $150,000 of receiver's certificates, reducing the amount outstanding to $280,000. (May. 13, p. 350.)

UNION PACIFIC.—On Nov. 1 this company took possession of the Omaha & Republican Valley, 482.04 miles; the Kearney & Black Hills, 65.74 miles, and the Union Pacific, Lincoln & Colorado, 225.35 miles. The lines were heretofore under the control of the receivers. (July 1, p. 486.)

Electric Railroad News.

ALBANY, N. Y.—The earnings of the Albany Ry. for the quarter ending Sept. 30 are reported:

	1898.	1897.	Inc. or Dec.	
Gross earnings	$174,681	$166,264	I.	$8,417
Operating expenses	102,637	96,871	I.	5,766
Net earnings	$72,944	$69,393	I.	$2,651
Other income	.....	601	D.	601
Interest, taxes, etc.	25,500	24,165	I.	1,335
Balance	46,545	45,829	I.	716

BROOKLYN, N. Y.—The passenger gross earnings of the Brooklyn Rapid Transit Co.'s system for periods ending Oct. 31 were:

	1898.	1897.	Inc. or Dec.
One month	$509,629	$443,923	I. $55,706
Three months	2,168,231	1,853,721	I. 314,510

CLEVELAND, O.—Reports from Cleveland state it is very likely that a consolidation will be effected within a very short time between the Cleveland City Ry. (the "Little Consolidated"), of which Mark A. Hanna is President, and the Cleveland Electric Ry. ("Big Consolidated"). It is also said that considerable stock of the Cleveland City was recently bought by banks acting in the interests of Henry A. Everett, who is President of the Akron, Bedford & Cleveland Electric Railroad, a road greatly depending upon the city roads.

DENVER, COL.—A suit for foreclosure of mortgage and sale of the West End St. Ry. Co. has been filed by the Central Trust Co. in the United States Circuit Court. The West End Railroad is 10 miles long. The mortgage is for $300,000, and, it is stated, the interest is in default since 1894.

A decree was entered in the District Court ordering the sale of the Colfax Ave. Electric Railroad to satisfy defaulted bonds.

Reports from Denver state that David H. Moffat, who is largely interested in local street railroads, is trying to effect a consolidation of the different companies.

GALVESTON, TEX.—The United States Mortgage & Trust Co., of New York, has filed suit in the United States Circuit Court against the Galveston City RR. Co. and the Guaranty Trust Co., of New York. The plea is for the foreclosure of the second mortgage of $75,000; that the lien may be made second only to the first mortgage, and that the amount due be ascertained and determined; that in default of the payment of this sum within the time limited by the court it may decree that the railroad company and the city and all persons claiming an interest in the property may be barred.

MIDDLETOWN, N. Y.—William B. Royce, of Middletown, N. Y., has been appointed Receiver of the Middletown-Goshen Traction Co. Justice Pryor made the appointment on the application of Ferdinand McKeige, Hugh H. Douglass, W. A. Grauterm and other directors for the voluntary dissolution of the corporation, on the ground of insolvency. The capital stock is $400,000, of which $275,000 has been issued, the largest stockholders being Cornelius D. McKeige, $104,600; Ida D. Van Steenbergh, $60,000; Saidee A. Thomas, $53,200.

NEW HAVEN, CONN.—The stockholders of the Fair Haven & Westville St. Ry. Co. ratified the merger with the New Haven St. Ry. Co. The capital stock of the Fair Haven & Westville will be increased from $900,000 to $2,000,000. Of the issue, $900,000 will be given outright to the stockholders of the Fair Haven & Westville, and the remaining $200,000, together with $500,000 cash, will be paid to the merged road. The cash is to be obtained by means of $500,000 one-year notes. While the merger is accomplished under the name of the Fair Haven & Westville Co., the New Haven St. Ry. interests predominate in the consolidation. (Oct. 28, p. 788.)

NORFOLK, VA.—Press reports state that B. Watkins Leigh was appointed Receiver for the Port Norfolk Electric Ry. upon application of M. E. Decker of New Jersey and the Mercantile Trust & Deposit Co. of Baltimore.

SYRACUSE, N. Y.—The Syracuse & Suburban has again applied to the Board of Aldermen to so amend its franchise that it may carry freight. The company tried to get such a privilege when it first obtained its franchise, and once or twice since.

WASHINGTON, D. C.—Press reports state that O. T. Crosby, C. A. Lieb and F. A. Stevens bought a majority of the bonds of the Anacostia & Potomac River Ry. Co. The road, which is now operated by the receivers, H. A. Griswold and B. S. Minor, will likely become part of the new City & Suburban RR., in which the buyers of the bonds are interested.

TRAFFIC.

Traffic Notes.

The Burlington road has delivered at Billings, Mont., during the past year 600 carloads of corn from Nebraska, bound to Washington and Oregon.

The State Railroad Commissioners of Texas have refused to authorize an advance of one-half cent per 100 lbs. (from three and one-half cents to four cents), on lumber from Beaumont to Port Arthur.

It is stated in the newspapers that the Canadian Pacific has accepted the decision of the arbitrators denying that road a differential on freight shipments to and from the Pacific Coast.

Chicago papers state that shipments of lumber, aggregating 5,000,000 ft., are to be taken from Duluth to Chicago by rail. The rate is said to be about $2.30 per thousand feet, 45 cents less than the current rate by lake.

The freight traffic at Portland, Ore., during the month of September, was the heaviest ever recorded, except in September, 1891. The railroads are unable to furnish more than about two-thirds the cars demanded for the shipment of wheat to the Pacific Coast.

Grain shippers are complaining to the State Railroad Commissioners of Kansas that the railroads do not supply them with cars for shipping their wheat. This looks as though some of the farmers who have been holding their grain for higher prices have concluded to let it go.

Notice has been given that the bondholders of certain Texas railroads will ask the United States Circuit Court for an injunction against the enforcement of the reduced tariff on cotton recently ordered by the State Railroad Commissioners. The notice was signed by interests connected with the Missouri, Kansas & Texas, the Southern Pacific, the St. Louis Southwestern, the International & Great Northern, the Gulf, Colorado & Santa Fe, the Houston & Texas Central and other roads.

A press dispatch from Cincinnati, Nov. 1, says: The decision of the United States Supreme Court against the Joint Traffic Association has shown its first local effect. The representatives of various roads who met here to discuss the call for bids for transporting the Sixth Regiment from Fort Thomas to San Antonio, Tex., decided not to agree upon bids. Every road was left free to act as it pleased. Counsel advised that an agreement upon rates for moving the regiment would be a violation of the Sherman anti-trust law.

At the meeting held in St. Louis Nov. 3, to consider the question of the reaffirmation of the 1898 pass agreement of the Western lines, after a discussion a resolution was adopted and a committee of five appointed to confer with representatives of lines in other territory, to ascertain to what extent they would co-operate in abolishing or restricting the issuance of annual and time passes. The committee will report at an adjourned meeting, Nov. 29. The 1898 agreement has not been observed since last April, when one of the members became dissatisfied and withdrew; but generally speaking, the Western Managers are in favor of its reaffirmation, and many of them are in favor of abolishing all passes, except trip passes. It is very doubtful, however, if enough roads will co-operate in a proposition of this kind to give it much real force.

Injunction Against Advancing Rates to San Francisco.

In the United States Circuit Court at Denver, Col., Nov. 3, a temporary injunction was issued restraining the Southern Pacific from advancing rates on steel and iron from Colorado points. The application was filed by the Colorado Fuel & Iron Company. The injunction also applies to the Denver & Rio Grande, Union Pacific, Colorado Midland, and Rio Grande Western. This suit was brought to prevent a proposed increase in the rate to Pacific Coast points of about 33 per cent.

Investigation of Alleged Illegal Rates.

Upon statements made to the Interstate Commerce Commission by C. G. Blake, a coal dealer of Cincinnati, and the rate sheets on file in its office, the commission has issued an order directing an investigation of the following charges against the Chesapeake & Ohio:

1. Transporting coal from mines in West Virginia to Cincinnati at less than the published tariff rates. 2. Exacting greater charges from Blake and others than it has from the Chesapeake & Ohio Fuel Company. 3. Discriminating in transportation facilities in favor of the C. & O. Fuel Company against Blake and others, including preferential and unjust allotment of cars at the mines. The case is set for hearing in Washington Nov. 28.

A Long and Short Haul Decision.

The Interstate Commerce Commission, in an opinion by Commissioner Clements, has announced its decision in the case of Phillips, Bailey & Co. against the Louisville & Nashville R. R. Co. and others. The case relates to the transportation of sugar and molasses from New Orleans to Nashville and Louisville, and the complaint alleged that higher rates for the shorter distance to Nashville than for the longer distance to Louisville were unlawful. The carriers contended that the circumstances and conditions were made dissimilar by water competition at Louisville. It appeared, however, that there was also water competition at Nashville, but that it was not so strong at Nashville as at Louisville. The Commission held, citing decisions of the United States Supreme Court, that the mere fact of competition, no matter what its character or extent, does not necessarily relieve carriers from the restraints of the third and fourth sections of the act; that the burden is upon the carrier in all cases where a departure from the rule of the law is proved to show clearly that such departure is justified, and that whether the circumstances and conditions of carriage have been substantially similar or otherwise are questions of fact depending on the matters proved in each case. The decision is that, while it may be in this case that as high rates on sugar and molasses for the shorter haul from New Orleans to Nashville than for the longer hauls to Louisville are justified, the evidence does not show such a substantial dissimilarity of circumstances and conditions as will authorize higher rates on such transportation to Nashville than are charged to Louisville. An order forbidding exaction of the higher rates to Nashville was directed to issue.

Chicago Traffic Matters.

Chicago, Nov. 7, 1898.

Local officers of the eastbound roads are feeling good over the condition of rates since the Joint Traffic decision. At first there was a general feeling that tariffs would be thrown to the wind and everybody would go out for traffic at the best obtainable figures; that there would be radical open reductions and all kinds of secret cuts; but none of these things has occurred as yet. Rates are no worse than for the last six months. Stronger efforts are being made to secure business, but the agents appear to be more careful in their quotations and contracts than before.

Differential passenger rates are bothering the officers of the eastbound roads more than any other one thing just now. Officers of the strong lines seem determined that if the weak lines do not advance rates, those by the strong lines shall be reduced.

The Central Passenger, the Central Freight and the Western Passenger Associations and the Western Trunk Line Committee are still in running order. Nothing is being done that could be construed to be a violation of the law. The presidents of the Chicago-St. Paul lines are meeting in the latter city to consider the future of the Western Trunk Line Committee, and a meeting of the Central Passenger Association is now being held in Chicago.